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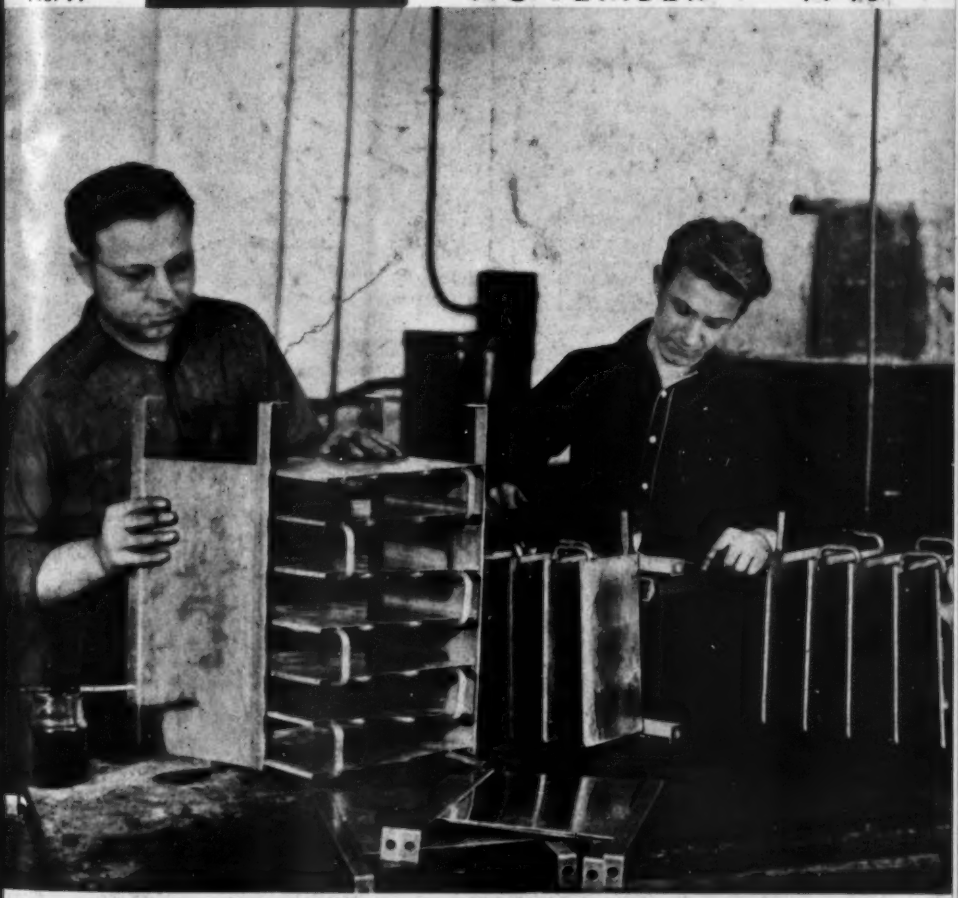

REFRIGERATION IN PHOTOGRAPHY •
WORLD'S SMALLEST COMPRESSOR •
COOLED WATER APPLICATIONS •

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The Refrigeration Service Engineer

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Cooled Water Applications

By WM. GAUGER *

WHEN we think of water cooling we are prone to think in terms of the coolers which supply us with the palatable cool water we drink from fountains in offices and public buildings. While this is the most common use for cooled water and may represent the greatest percentage of units installed, we have seen in recent years an ever increasing demand for refrigerated water to produce better products and better equipment. We are continually hearing of some new method either in processing or in some industrial application where refrigerated water has caused a marked increase in production or a greater accuracy on the finished article, due to lowered temperatures of the machine and products being manufactured.

A great many refrigeration men have shied clear of water cooling because they have not analyzed the application thoroughly enough. They are familiar with drinking water applications where 1/6-h.p. or 1/4-h.p. compressors have been used as packaged units, but when they get to the bigger installations or on special jobs, they have encountered trouble because the equipment was entirely too small and did not do the work required of it.

To properly cool water is no different than cooling a storage box or a meat case. In either case to obtain the desired temperature within certain limits, a definite amount of work has to be done. In figuring water cooling loads, we have to take into consideration certain facts, based on peak operations to arrive at a correct load and one must have the following information at hand: the total number of gallons to be used, the maximum tap water temperature available during the hottest summer months, the water temperature required at the point of use and the time element.

For example: 200 gallons of 38-degree water is required per hour with a tap water temperature of 80 degrees. The B.t.u. load will be 200 multiplied by 8⅓, to give the pounds of water, multiplied by the temperature difference of 42 degrees (80—38), or 70,000 B.t.u.'s per hour, which is approximately six tons of refrigeration.

Here of course, it is quite readily seen that it does not take a great deal of water to require a fairly good sized machine to handle the load, and it is not uncommon to see water cooling units similar to the above, requiring 10 and 25 tons of refrigeration, but in every instance, no matter if there is 10 or 1000 gallons to be cooled, the load must be calculated in the same manner, with all details considered.

From a refrigeration standpoint, water cooling may be classified into three general

* Commercial Coil and Refrigeration Co., Chicago.

divisions, namely, (1) water for drinking, (2) water for industrial cooling applications, (3) water for processing, such as bottling plants and bakeries.

The first application, namely, drinking water, is the best known to the average person, because we find an extremely large field for cooled drinking water aside from the offices, in restaurants, cafeterias, hotels, resorts, soda fountains, theaters, hospitals, schools, sanitariums and manufacturing plants.

DRINKING WATER REQUIREMENTS

LOCATION	WATER PER HR.
Soda Fountain	.4 gals. per stool
Offices	.125 gals. per person
Stores	.175 gals. per person
Hospitals	.20 gals. per person

The proper temperature of drinking water for human consumption, generally speaking, is around 50 degrees. However, for restaurant service, where water is served in glasses which may be at room temperature considerably above 50 degrees or may have just come from washers and sterilizers, it is customary to supply water from the mechanical cooler at temperatures of 40 to 45 degrees, taking into consideration that it will be warmed up by the warm glass or by standing on the table before being consumed.

On the other hand, in some industrial applications where mechanical water coolers have been used to supply drinking water for working men, it is necessary to furnish water at higher temperatures, because in such work as steel mills where heavy labor is involved and the workers must perform their duties under high surrounding temperatures, it is customary to furnish cooled water at temperatures of 60 to 70 degrees, as water that is too cold is too severe on workmen.

Industrial Cooling

In the second classification, namely, water for industrial cooling, we find many uses for refrigerated and properly controlled water temperatures. In all the following mentioned applications, the underlying purpose that is foremost in the minds of the engineer in applying refrigerated water, is to speed production and produce a better product.

In factories where centerless grinders or heat treating equipment is used, or in the general photographic and X-ray film business, water has helped considerably to speed up the work and give more satisfactory results.

In the mechanical plating industry it has been found that water at high temperatures retarded the plating, and it is necessary to bring the temperature of the water down and hold it down in order to obtain quality plating.

Another industry aided by the use of cooled water is the manufacture of optical lenses, which has found that with the lens temperatures under control during the grinding process, a more accurate surface can be obtained.

In some printing processes, in order to obtain and produce uniform results, the rolls of the press are so equipped that cooled water can be circulated to keep them at a desired temperature. Needless to say, a better piece of literature is obtained by this method.

In the rubber industry, there are some processes where the hot rubber passes over rolls, and in order to effectively remove the heat from the rolls and to obtain better results, cooled circulating water has been used within the rolls.

In the manufacture of wax paper, processes similar to those used in the printing and rubber industries have been adopted with very good results.

One might add that the farmer, due to recent laws passed in a number of states, has put in varied types of water cooling systems to bring the temperature of milk down to that required by law.

Water for Processing

Now, we come to the third classification, that of water used for processing, a branch of the field not as widely known to all of us, but an extremely important phase of the industry. About the two best known users are the soft drink bottlers and the bakers, who have found by test, that by using refrigerated water, a better and more salable product is produced.

The more interesting of the two, as far as refrigeration is concerned, is the bottling plant, due to the great quantities of refrigerated water used and the quick manner in which the temperature is dropped. In the soft drink industry, large quantities of carbonated water are used and in its preparation, near freezing water is required. The amount of gas absorbed by the water depends directly on the temperature of the water and the pressure of the carbon dioxide

gas. The colder the water, the less gas pressure is required for the desired carbonation.

Further, it is more stable at lower temperatures and does not have a tendency to lose its charge of gas as it is being consumed in the bottle-filling machines, for it is here that a drink can lose its sparkle and zest for which it is intended. A simple check on a gas absorption chart at variable temperatures and pressures, will tell at a glance what the bottlers have had to work out by cut and try methods over a period of years.

This chart gives the volume of CO_2 gas dissolved per volume of water. For instance, with the water temperature at 33 degrees and the CO_2 pressure at 25 pounds, 4.6 volumes of CO_2 will be absorbed by one volume of water. In comparison, to obtain the same results with 50-degree water, it requires 42 pounds CO_2 pressure, which is not a desirable pressure as it causes too much breakage.

Bottling Methods

The water temperature to be used by the bottler is important and depends upon the bottle-filling equipment he is using. This fact should be determined before estimating on any water-cooling equipment. That is to say, there are three classes of equipment on the market operating with different temperatures, such as those using (1) tap water, (2) 50-degree water, (3) near freezing water, or as bottlers refer to it, stable water.

When tap water is used, a constant pressure must be maintained against the carbonated water up until the bottles are capped. But even here, when the water is cooled in the same processing machine a more uniform and zestful product is likely to result.

Second, units operating at 50 degrees have a special valve design for releasing the pressure on the filled bottles to avoid loss of carbonation.

Third, the most commonly used unit and the one found to be most satisfactory is the one operating at the near freezing temperatures, temperatures which stabilize the carbonated water.

In addition to cooling the water, some types have been designed to cool the syrup to about *45 degrees to 50 degrees* or colder as it is used in the processing. It has been found that a warm syrup tends to free the carbonated gas from the water before the bottle is capped.

Systems Used

The cooling of water in bottling plants is accomplished by a number of different refrigeration systems, some of which are (1) Tank unit, (2) Brine circulating, (3) Baudelot, (4) Shell and coil, (5) Shell, tube and tray cooler.

The tank unit is usually an open type cooler with the refrigerating coils submerged in the water and some baffling system employed to get the maximum water cooling. This is a slow method and is gradually dropping out.

The brine circulating unit is a double shell cooler, one side housing the low temperature coil and the other the water coil. The cooling coil can either be a dry expansion coil or a part of the plant brine system. In either case, the water coils are immersed into circulating brine and operate on a closed system.

The Baudelot, or down feed type cooler, consists of a spirally or flat wound coil, over which the water gravitates. Some of these units operate either closed or as open types.

The shell and coil unit is a closed system cooler wherein the water coils are immersed into the refrigerant.

The tray type employs a gravity system of trays in which the refrigeration coil lies, and over which the water travels, the trays acting as a guide for the water to flow through.

The shell and tube type is also a closed type with the refrigerant in coils and the water circulating over and around the coils.

In all these coolers we find direct expansion employed, except in the shell and coil cooler which is sometimes operated by a float.

Rapid Cooling Essential

Depending upon the capacity of the cooling unit, it requires on an average less than a minute for the water to be brought down in temperature and to be properly carbonized with CO_2 gas. From this point on through the process, water is added to the syrup and is thoroughly mixed. It is bottled, crowned, labeled and packaged, all of which requires more time than it takes to refrigerate the water.

In some inland locations, the tap water will be as high as 90 degrees, and when 34 degrees is required for carbonation the temperature must be dropped 61 degrees. When 500 to 1000 gallons of such water is required

per hour, it can be readily seen that the water must be cooled in a hurry and needs a lot of refrigeration. The refrigeration loads are figured in the same manner, as previously mentioned, taking into consideration temperature drop, quantities, and line losses as it is being run through the bottling equipment.

Due to their higher viscosity, the syrups will require about 50 percent more refrigeration than water.

Baking Industry

One finds three uses for refrigerated water in the bakery: First, as ingredient water; second, as a cooling medium for the fermenting room; and third, as a cooling medium for the mixers. Refrigerated ingredient water, with temperatures ranging from 33 to 38 degrees, is used to remove the heat of the dough generated in the dough mixing process. Generally speaking, all products used in larger bakeries are held to a fixed temperature for safe storage and also to distribute the refrigeration load. A balanced load does not cause overloading of the equipment and tends to speed up the mixing time.

In smaller bakeries, when cooling jackets are not available and the speed of the mixture is cut down considerably, the cooled ingredient water is relied upon to hold the temperature of the mix as near as possible to 78 degrees.

Cooled water, when available, is used in fermenting rooms, not only to obtain the desired temperature but to maintain a high relative humidity.

Cooling the Mixer

In the third instance, a temperature of 78 degrees is best suited in mixing dough, and in order to obtain this it is necessary to counteract the heat generated in the mixing process by an outside source, that of cooling the mixer by refrigerated water circulated in a jacket built into the mixer. The heat generated in the mixing process is caused by the heat of hydration of the flour which has been found to be 6.5 B.t.u.'s per hour per pound. Friction, which is electrical energy converted into mechanical and then into heat energy, is 42.44 B.t.u.'s per minute for every 100 pounds of dough. If the ingredients are not refrigerated or the room is not air-conditioned, it will be necessary to figure in these additional loads.

All these loads are then figured together to arrive at the total load.

Thus we see that every minute added to the mixing time, due to warm ingredients or a warm mixer, generates additional heat, and one can readily see the effect of holding temperatures on the speed of the mix by the use of refrigerated water.

SERVICE ENGINEER AND MAYOR OF THE CITY

IN the hustling city of Nampa, Idaho, B. H. Waigand is not only the owner of the city's principal commercial refrigeration sales and service company, but since April, 1939, has been the city's Number One citizen.

B. H. WAIGAND

It was in April, 1939, that for perhaps the first time on record, a refrigeration service engineer became Mayor of his town. Nampa is a town of about 9000 population, and provides eleven service engineers with a livelihood. It cannot be considered a small town, and no doubt, its demands on its Mayor's time are quite heavy. Nevertheless, Mayor Waigand still operates the B. H. Waigand Commercial Refrigeration Company, handling nearly all the commercial work in the town, in addition to his duties as Mayor, and from all reports, he is doing a mighty fine job of both. He is a native son of Nampa and worked fourteen years as chief engineer of the Pacific Fruit Express in the same city prior to going into his own business. He is an aviation enthusiast, and often takes parties into the hunting sections of Idaho after various kinds of game.

Estimating and Selling Commercial Refrigeration

(Second Article)

Continuing with his series on quick methods of estimation, the author in this article discusses the problems of the meat market.

By S. C. MONCHER*

DUE to the rapidity with which fresh meat spoils, it can be made available commercially only where refrigeration is possible. Fresh meat is a difficult food to keep even under refrigeration, and the butcher has reconciled himself to losing a certain amount of his product through shrinkage and trimming. With old type refrigeration systems, the shrinkage and trimming were inevitable, but the modern mechanical refrigeration system can eliminate this almost completely.

It is upon this point, therefore, that the sales presentation to a butcher should be based. With conditions of 36 degrees temperature and 90 percent relative humidity in a meat refrigerator, shrinkage and dehydration become negligible. It is easily seen that if a butcher who handles 1000 pounds of meat a week can cut down 5 percent on shrinkage and trimming, he will save over $500 per year. Every butcher will sit up and take notice when he is approched with this method of excluding waste.

Walk-in refrigerators have long been common for meat storage. In addition, the up-to-date meat market has added a refrigerated display case, and perhaps a freezing compartment for those items which must be stored for longer periods of time. To minimize heat gains, it is best to have a common wall between walk-in refrigerator and freezer compartment, the entrance to the freezer being through the walk-in refrigerator. The survey sheet following is for a meat market containing a walk-in freezer combination of this type, plus a top ("single duty") display case.

Analysis of Survey Sheet

A study of the survey sheet will disclose several items which make this installation a bit different from the one discussed in the last article.

SURVEY SHEET FOR MEAT MARKET

	WALK-IN REFRIGERATOR	DISPLAY CASE	FREEZER COMPARTMENT*
Size (O.D.)	12x14x10 high	20′ long	12x5x10 high
Insulation	4″ rockwool	3″ cork	6″ rockwool
Common walls	12x10		12x10
Glass	triple window 6′x3′	double	none
Maximum store temperature	90°	90°	90°
Refrigerator temperature	36°	40°	15°

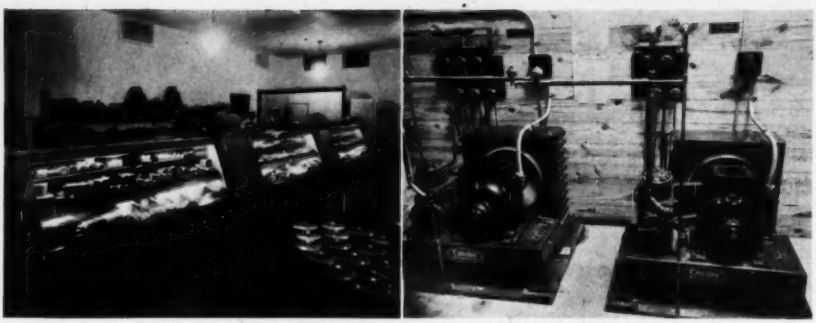
* Pounds of meat frozen per 24 hours—300.

In the first place, due to a common wall between them, both the walk-in refrigerator and the freezer have only three walls exposed to the outside temperature. In the second place, the walk-in refrigerator has a 6x3-foot triple glass window. These factors will be taken into consideration in the load calculations.

Load Calculations for Walk-in Refrigerator

Surface exposed to 90° F. (surface A)	14x10x2 = 280	
	14x12x2 = 336	
	12x10x1 = 120	
Total		736 square feet

* Author of Commercial Refrigeration and Comfort Cooling.



A MARKET INSTALLATION OF THE LATEST DESIGN

The very latest in equipment, engineering, and installation procedure is the theme of this installation made recently in the super market of Community Stores, Inc., Jackson, Miss., by Refrigeration Equipment Co., Baton Rouge, Louisiana.

Refrigeration equipment consists of three 11 ft. Friedrich display cases with forced convection lowsides; one 8-door Friedrich "reach-in" refrigerator with forced convection lowside; and one 7 foot by 11 foot by 8½ foot "walk-in" cooler.

Air cooled condensing units are Carrier model 7G2, 1½ h.p., located on the same floor as the refrigerators. Condensing unit on left supplies refrigeration to the three display cases. Reach-in and walk-in refrigerators are handled by condensing unit on right.

Liquid and suction lines of the refrigerating machines are cross connected so that during "low load" periods or in event of failure on one condensing unit, the entire load may be directed to the other condensing unit.

Refrigerant lines are hard drawn copper tubing. All joints are 95-5 soldered. Because the condensing units are on the same floor as the refrigerators (basements are scarce in the south), the liquid and suction lines are brought "up" into the inverted manifolds.

In each liquid line is a permanent dryer which incidentally is equipped with flare fittings to facilitate removal should this became necessary at some future date.

Manifolds are Superior Type HE with heat exchanger (superheater) built into the suction manifold. The built in heat exchanger, claims Mr. Felder, of Refrigeration Equipment Co., superheats the return suction gas to around 80 degrees F., assuring full condensing unit capacity in accordance with A.S.R.E. rating methods; also sub cools the liquid refrigerant to improve its quality by materially reducing flash gas. Decrease in running time and current consumption by the use of built in suction-liquid line heat exchangers is estimated 11 per cent.

In planning their installations, Refrigeration Equipment Co. work closely with Standard Brass & Manufacturing Co., Beaumont and Houston, Texas, refrigeration supply jobbers who supplied the manifolds, valves, dryers, tubing, fittings and other installation supplies and materials on this job.

A firm believer in quality refrigeration equipment, Refrigeration Equipment Co. operate on the theory that the installation is made only once, and therefore it should be the best possible, utilizing the latest in equipment, materials, methods, and the finest workmanship.

Surface exposed
to 15° F. = 12x10x1 = 120 square feet (surface B)

From Table 5, the overall heat load factor for a refrigerator of the type we are considering, insulated with the equivalent of four inches of corkboard* and containing 856 square feet of outside surface is 3.7 B.t.u. per 24 hrs. per sq. ft. per degree temperature difference. The temperature difference for surface A is 90 — 36 = 54 degrees, while for surface B it is 36 — 15 = 21 degrees.

Heat load A =
736 × 3.7 × 54 = 147000 B.t.u. per 24 hrs.

Heat load B =
120 × 3.7 × 21 = 9400 B.t.u. per 24 hrs.

Inasmuch as heat load B is in favor of the walk-in refrigerator, the total load is obtained by subtracting heat load B from heat load A.

Total load =
147000 — 9400 = 137600 B.t.u. per 24 hrs.

In order to provide for the additional heat gained through the window in the walk-in refrigerator, we make use of Table 6. This shows the difference between the conductivities of four inch corkboard and triple glass

TABLE 5—OVERALL HEAT GAIN FOR A WALK-IN MEAT REFRIGERATOR, EXPRESSED IN B.T.U. PER SQUARE FOOT PER DEGREE PER 24 HOURS.

INSULATION	100-600 SQ. FT.	600-1600 SQ. FT.	1600-3500 SQ. FT.	OVER 3500 SQ. FT.
2"	4.9	4.8	4.5	4.2
3"	4.1	4.0	3.8	3.5
4"	3.8	3.7	3.5	3.2
5"	3.5	3.4	3.2	3.0
6"	3.3	3.2	3.0	2.8

* The following insulating materials are considered to have an equivalent insulating value as corkboard: rockwool, balsam wool. celotex, kapok. For sawdust, multiply thickness of insulation by .6 to get equivalent inches of corkboard.

A typical small market installation of Tyler display cases and a walk-in cooler in the background. The corner piece in this arrangement gives a finished appearance to the installation and provides additional display space. The equipment was sold and installed by McCarty Brothers, River Forest, Ill.

TABLE 6—HEAT GAIN THROUGH A REFRIGERATOR WALL CONSTRUCTED OF CORKBOARD OR EQUIVALENT AND LINED ON BOTH SIDES WITH LUMBER, EXPRESSED IN B.T.U. PER SQUARE FOOT PER DEGREE PER 24 HOURS.

INSULATION IN INCHES	B.T.U.		B.T.U.
1	3.0	single glass	24.5
2	2.4	double glass	12.8
3	1.9	triple glass	7.1
4	1.5		
5	1.2		
6	1.15		

to be $7.1 - 1.5 = 5.6$ B.t.u. per 24 hrs. per sq. ft. per degree of temperature. Inasmuch as we have 18 square feet of glass, the load from this source is $5.6 \times 18 \times 54 = 5500$ B.t.u. per 24 hrs. This added to the total load, gives a grand total of

$137600 + 5500 = 143100$ B.t.u. per 24 hrs.

Calculations for Display Case

From Table 7, the overall factor for a 20 foot single duty display case with double glass is 56 B.t.u. per 24 hrs. per lineal foot per degree temperature difference.

TABLE 7—OVERALL HEAT GAIN FOR MEAT DISPLAY CASE (SINGLE DUTY, TOP COMPARTMENT ONLY), EXPRESSED IN B.T.U. PER LINEAL FOOT PER DEGREE PER 24 HOURS.

	UP TO 10 FT. LONG	OVER 10 FT. LONG
Double glass	59	56
Triple glass	49	46

Total load =

$56 \times 20 \times 55 = 61600$ B.t.u. per 24 hrs.

Calculations for Freezer Compartments

Surface exposed to 90° F. (surface A) = 5x10x2 = 100; 5x12x2 = 120; 12x10x1 = 120

Total ..... 340 square feet

Surface exposed to 36° F. (surface B) = 12x10x1 = 120 square feet

From Table 9, shown on page 18, the overall factor is 1.8, plus 100 B.t.u. for every pound of meat to be frozen in the freezer compartment of the walk-in cooler per 24 hrs.

TABLE 8—OVERALL HEAT GAIN FOR MEAT DISPLAY CASE (DOUBLE-DUTY, WITH BOTTOM STORAGE COMPARTMENT), EXPRESSED IN B.T.U. PER LINEAL FOOT PER DEGREE PER 24 HOURS.

	UP TO 10 FT. LONG	OVER 10 FT. LONG
Double glass	79	75
Triple glass	66	62

Heat load A =

340 × 1.8 × 75 = 43400 B.t.u. per 24 hrs.

Heat load B =

120 × 1.8 × 21 = 4300 B.t.u. per 24 hrs.

Assuming 300 pounds of meat to be frozen every 24 hours, we must add 30000 B.t.u. to get the total load.

Total load =

43400+4300+30000=77700 B.t.u. per 24 hrs.

A recent innovation in meat storage is the use of ultraviolet radiation in refrigerators. Due to the fatal effect of ultraviolet rays on bacteria, it permits a higher refrigerator temperature. The advantages of this method are as follows:

(1) Operating costs are lower with higher refrigerator temperatures.

(2) Meat stored at higher temperatures becomes more tender than meat stored at low temperatures.

TABLE 9—NON-PRODUCT HEAT GAIN FOR MEAT FREEZER REFRIGERATOR, EXPRESSED IN B.T.U. PER SQUARE FOOT PER DEGREE PER 24 HOURS. FOR TOTAL LOAD, ADD 100 B.T.U. FOR EVERY POUND OF MEAT TO BE FROZEN PER 24 HOURS.

INSULATION	UP TO 250 SQ. FT.	OVER 250 SQ. FT.
4	2.2	2.1
5	2.0	1.9
6	1.9	1.8
7	1.8	1.7
8	1.7	1.6

Weber Research Engineer Builds World's Smallest Working Compressor

FOR nearly a quarter of a century, W. A. (Bill) Pruett has been in charge of the Refrigeration Research Department of the Weber Showcase & Fixture Company, Inc., Los Angeles, California. During this time Mr. Pruett has developed and perfected many new products manufactured by the Weber organization.

During his spare time, Pruett is a model enthusiast and has several small working models of equipment to prove his skill along these lines. The latest achievement he has developed is the smallest working refrigerator plant we know of. All parts of the unit were actually worked out and manufactured by Pruett himself, and the compressor, which is an actual working model of many large compressor units used in Weber equipment, is only 3⅝ inches high and 5¼ inches in length overall at base. The unit has a speed of 400 r.p.m. The bore is ⅝ inch and the stroke is also ⅝ inch. The machine is driven by a 1/20th-hp. Bodine motor. Piston displacement is .191 cubic inches; B.t.u. rating, 110 B.t.u.'s per hour, at 24 pounds suction pressure and 105 pounds head pressure. The crankshaft bearings are ¼ inch in diameter, with sylphon seal on crankshaft.

It has hollow wrist pins ⅛ inch in diameter, 9/16 inch long. The fly wheel diameter is 3¼ inches. A Trapit filter is used on the liquid line. Bronze bearings are used throughout, including wrist pin bearings. Close-grained wear-resisting Meehanite metal castings were used for cylinder and piston.

A direct expansion system of refrigeration with Freon gas used as the refrigerant, operates the machine which has a splash oiling system.

The purpose of this small compressor is for the frosting of a sign over the machine, as shown in the accompanying illustration.

The sign, "Roll-A-Door," is the name of the well-known Weber Roll-A-Door Frosted Food and Ice Cream Cabinet. The actual sign is constructed of Revere copper tubing, which is .040 inch inside diameter and .075 inch outside diameter, and frosts up to the size of a common lead pencil.

First public exhibition of this world's smallest working refrigeration plant will be at the Weber booth at the Dairies' Industries Institute which will be held in Atlantic City starting October 21.

Pruett worked over a year in his spare time perfecting this unit, making patterns and tooling work. Already he has received much praise and commendation from model builders and refrigeration men throughout the country.

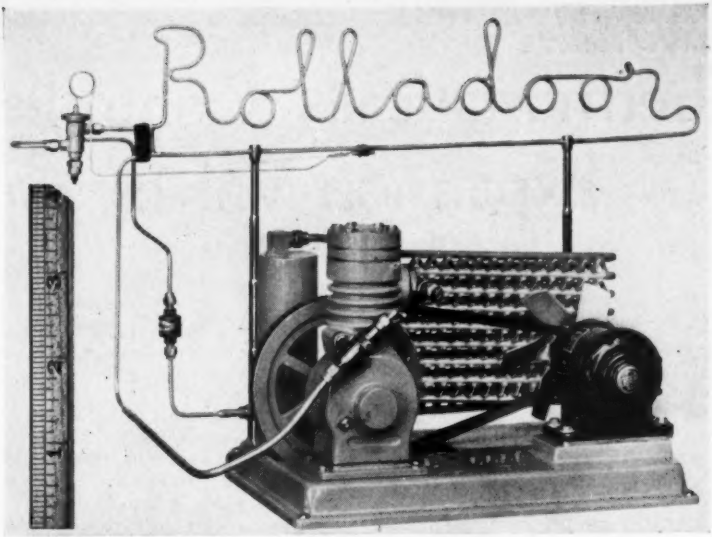


Fig. 1. Illustrating the working model of the condensing unit and refrigerated sign built by W. A. Pruett. The scale of this illustration is exactly one half actual size, and can be verified by checking the rule pictured at the left. Using your rule and checking some of the parts of the unit, it is interesting to note the diameter of the "Trap-it" filter, the length and diameter of the thermostatic valve, the diameter of the flare fittings and shut-off valves. Compare these sizes with the size of the smallest parts found on the market.

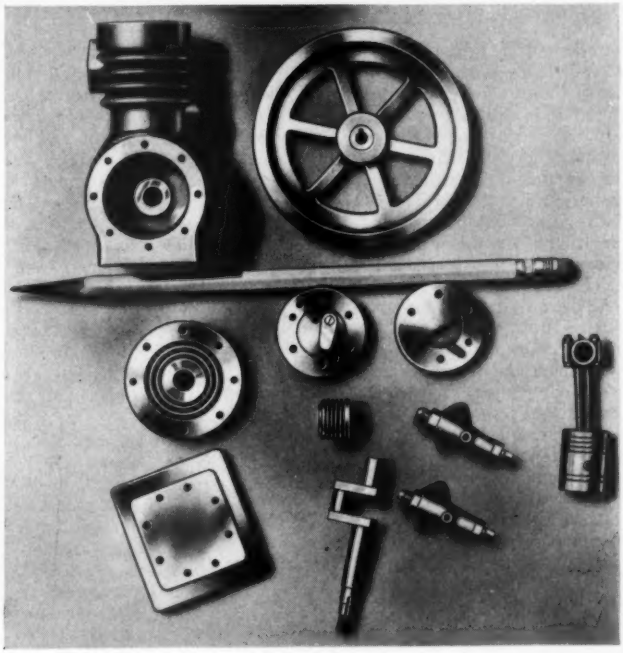


Fig. 2. Shows the various parts of the compressor with an ordinary lead pencil as a comparison of size. Note the sylphon seal which is only ½-inch diameter, the crankshaft which is smaller in diameter than the lead pencil.

Fourth Article

Thermostatically Controlled Expansion Valves

By A. F. HOESEL*

IT might be well at this point to discuss the basic differences between the so-called gas-charged thermal valve and the so-called liquid-charged thermal valve.

In Fig. 5, I show a diagrammatic cross-sectional view of the conventional thermal power element system of a diaphragm-operated thermal valve, having a liquid thermostatic charge.

The space between the diaphragm and the diaphragm cover, the inside of the capillary tube and the inside of the temperature-feeler bulb, comprises a closed system in which the proper amount of thermostatic charge is confined by means of sealing the end of the temperature-feeler bulb after the proper charging.

In the gas-charged valve the temperature-feeler bulb, as shown in Fig. 5, is usually replaced with a section of the capillary tubing wound up in spiral form, similar to a spring.

In order to use a gas charge it is very important, for proper operation of the valve, that provision be made to ensure that the temperature of the diaphragm and its immediate adjacent parts, during the feeding operation of the valve, be at all times higher than the temperature of the temperature-feeler bulb.

At present, three different methods are in common use. One method comprises using an insulation to space the power element away from the temperature effects of the valve body proper. We are all familiar with certain types of valves in which bakelite spacers were used for that purpose. In recent years stainless steel of rather thin cross-section, and because of its low rate of heat conductivity, has also been so used. The second method comprises the use of the high-temperature incoming refrigerant liquid, before expansion through the valve orifice, to maintain the diaphragm and its immediate adjacent parts at a sufficiently elevated temperature. The third method comprises such construction that the complete expansion of the refrigerant takes place outside of the valve body proper.

Supposing we have a valve suitable for gas-charged operation, we now determine the proper gas charge for the valve according to the operating temperatures of the cooling unit upon which it is to be used.

Supposing we wish to charge the valve for use with a cooling unit employing methyl chloride, and to start operating at 35 degrees F. during the on-time cycle. If the valve must feed at 35 degrees F. cooling unit temperature and during the compressor on-time cycle, with, say, a 10 degrees F. superheat adjustment, we must gas charge the thermal element system with sufficient vapor so that it is in a saturated state in the temperature-feeler bulb, at not less than 45 degrees F. If the thermal charge is Methyl Chloride then the gas charge pressure cannot be less than 32.8 lbs. gauge. Commercially, such valve might be charged to somewhat higher pressure because of certain limitations not necessary to enumerate now.

For air conditioning systems operating at higher pressures, we would naturally proportionately increase the amount of gas charge, and for low temperature systems, with accompanying lower operating pressures, we would naturally proportionately decrease the amount of gas charge.

Using a Liquid Charge

Supposing we decide to use the so-called liquid charge. The first thing with which we must be concerned is that the design of the valve is such as not to greatly vary the temperature of the diaphragm and its adjacent parts due to variation in the flow of the comparatively hot high-pressure refrigerant liquid to the valve.

Normally, during operation, the space between the diaphragm and the diaphragm

* Flow Controls Inc., Chicago, Ill.

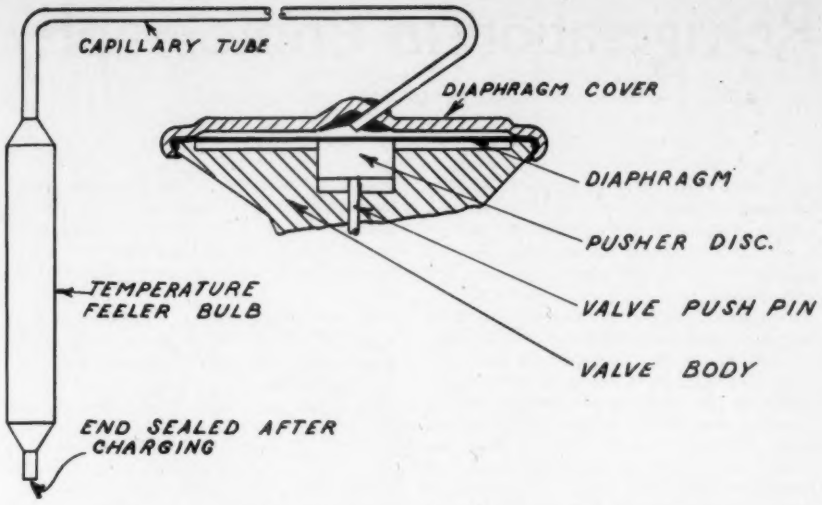


Fig. 5. The thermal element system of a diaphragm operated thermal valve.

cover is filled with thermostatic fluid in liquid phase, and wide variations in temperature at this point tend to make the valve operation erratic.

It will suffice here to state that the volumetric capacity of the temperature-feeler bulb of a liquid-charged valve is considerably greater than the volumetric capacity between the diaphragm and the diaphragm cover whenever the valve is in its wide open position with the diaphragm in its full downward position, and the system is usually charged with sufficient thermostatic fluid, in liquid phase, to not quite fill the internal volume of the temperature-feeler bulb. This ensures some residual thermostatic liquid within the temperature-feeler bulb at all times, whenever the proper volume of thermal fluid is charged.

During the normal on-time and off-time cycles of a refrigerating system, it is practically immaterial whether the thermal expansion valves used are of the so-called gas-charge or the so-called liquid-charge type, insofar as any material operating differences arising due to the differences in the charging are concerned.

Proper proportioning of orifice sizes, relative to vaporizing capacity of the cooling unit, in order to prevent wide swings in the feed of refrigerant to the cooling unit is just as important with one as the other.

The only time that the gas-charge valve shows a material variation from the liquid-charged valve is during the initial start-up, or a start-up after a prolonged shut-down. In this case the compressor tends to pump down the system to a pressure corresponding to the gas charge pressure minus the necessary superheat pressure, before the valve starts feeding refrigerant to the cooling unit. With proper proportioning of valve orifice sizes this same effect may be substantially secured with the liquid-charged valve.

S S S

P. M. Kashiwabora
Kauai

I think that it is one of the best magazines I have ever read, especially the Question Box. I will continue to subscribe to the magazine. I find it very helpful to my work. Thanking you for such fine service and information.

Helmer J. Landing
Sweden

Let me express my appreciation of the way you edit this interesting little book. To me over here it feels good to have some connection every month with good old U.S.A. and you may be sure that every word is read before I let the book rest.

Refrigeration in Photography

By JAMES CERNOHOUZ Jr.*

THERE are many business establishments, apart from the usual food merchants, waiting to be sold on the need of refrigeration. These applications are, of course, the least publicized ones, and for that reason, may be more difficult to sell. Knowing the problems of your customer, however, and knowing how refrigeration can help him in the process of his work provides you with much of the necessary ammunition with which to sell the job, and to render more efficient service in the future. It is with this thought in mind that this article has been written. Rather than presenting a treatise on how to refrigerate, it deals with the reasons why refrigeration is necessary to the commercial photography field.

Photography has become a great industry and art. Its use has become so much a part of our life that should we suddenly become deprived of its accomplishments, we would feel it as keenly as if we found ourselves deprived of the automobile.

Were it not for photography, how could so many of our large firms bring to all sections of the country a knowledge of their products? How could we determine which is the product we want without reading their descriptive pamphlets and seeing detailed illustrations of their different items? It would be going back to the "horse and buggy days" for business were it not for the part photography plays in speeding up the transportation of knowledge and news.

No matter what the process of printing, photography is the first step in each of them. You have seen periodicals where the printed picture is so good it rivals the actual photograph. Much of the printed matter you read is no longer set by hand or linotype, except in newspapers where the need for extreme haste in getting the latest news to the public makes it necessary to use the type printing. Today, it is possible to merely typewrite your message in the form you wish to have it printed and incorporate an illustration or photograph of the item described in the article. You then photograph the result, either enlarging or reducing to the desired size, and you have started the process of making a printing plate which will then be inserted in a press ready for printing.

There are two general classes of photography in the production of printing plates. These are known as line work and half-tone. The typewritten or drawn part of the message is the line work and does not present any great problem to the photographer. The photograph part is known as the half-tone; and in the process of making a half-tone lies the great need for refrigeration. The half-tone is accomplished with what is known as a half-tone screen. This screen is made up of two pieces of glass, each one having opaque diagonal lines cut into the surface and then cemented together so that the lines are in the center and placed so that they are at right angles to each other. These screens are designated by the number of lines to the inch, going as high as 400 lines, forming as high as 160,000 openings to every square inch of screen. The 400-line screen will give you the finest printed picture it is possible to produce.

Making Printing Plates

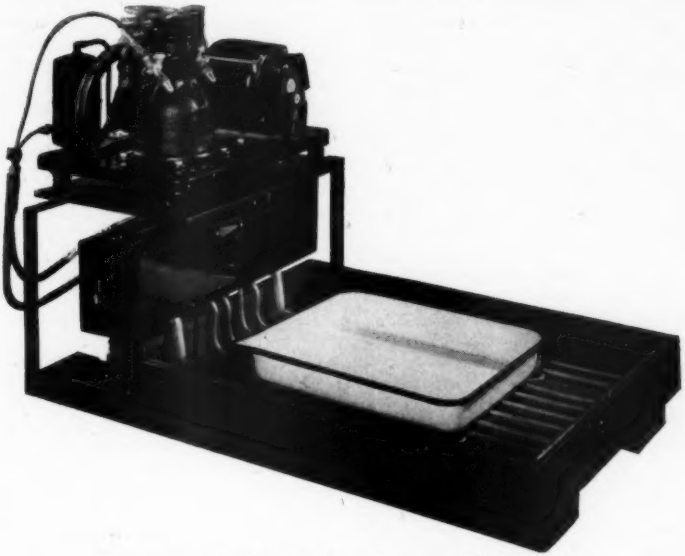
The first step in making a printing plate is the photographing of your original copy through the screen which is set at a determined distance just in front of the photographic plate. If the screen were not used, we would have a printing plate which would print only black and white outlines of shadows and high lights; that is to say, all parts of the original photograph which are lighter than one half shade would appear white; and the parts that are darker than one half shade would appear a solid black, thereby printing up more like a silhouette than a picture.

The function of the screen is to convert continuous tones into separate printing surfaces. The placing of the screen directly in front of the negative causes the light reflected from the copy to pass through the open or clear spaces of the screen onto the

*R. R. Robertson, Chicago, Ill. Paper delivered before Illinois State Association R.S.E.S., Oct. 19, 1940.

photographic plate. This produces a dot formation over the entire surface of the plate. Each half-tone dot represents a minute portion of the picture. The size, shape, and proximity of the dots recreates the tones of the original, such as high lights, three quarter tones, half tones, quarter tones, and shadows.

Until a few years ago, the photographic plate was of glass surfaced with a wet coating of sensitized emulsion having a collodion base. This is known as the wet plate process and does not require refrigeration. Although it is a slower and more costly method, it is still being used in a number of plants throughout the country.



Type of equipment designed for use in commercial photography.

In these modern times, plants are switching to film wherein they have a method of producing high grade negatives faster, more accurately, more economically, and cleaner than with the wet plate system. The adoption of film necessitated controlled temperatures in the development of the negative, due chiefly to the fact that the emulsion is of a gelatin composition, and also because of the type of developer required to convert the invisible image caused by the action of the reflected light on the photographic film into a visible one.

The developer contains: First, a reducing or developing agent which eats away only those parts of the image which have been exposed to the light in a proportion to the amount of light striking the plate; second, an alkali which opens the pores of the gelatin to allow the developer to penetrate the emulsion easily; third, a preservative which prevents too rapid oxidation caused by absorption of oxygen from the air; and fourth, a restrainer which aids in controlling the developing agent so that it will not affect the unexposed particles of silver.

Hydroquinone is the most generally used developing agent since it produces dense, fine-grained images so desirable in printing. Because it is affected more by temperature than any other developing agent, it has been found to be most effective at a temperature of 65 degrees. A higher temperature will cause filling and fogging of the dot formation, thereby increasing the speed of development, and the energy of the reducing agent becomes so strong that it reduces the silver salts on the entire surface of the emulsion, and the dot formations lose their sharpness and become mushy. The solution oxidizes very rapidly at high temperatures and has a tendency to stain the gelatin, thus causing a chemical fog and increasing the printing time. A partial de-

composition of the solution also occurs, and the gelatin film will swell and soften making it extremely difficult to handle and causing it to increase the drying time. High temperatures will also cause the solution to expend its energy rapidly, causing it to age quickly and become unfit for use.

As the various agents in the developer are affected unfavorably by both higher and lower temperatures, any excessive deviation either way will cause the developer to work unevenly and affect the contrast of a picture. If the temperature is too low, there is a hazard of underdevelopment as the action is delayed, making it very difficult to produce uniform negatives, since the hydroquinone will precipitate and become practically inactive at temperatures below 60 degrees.

After the negative is developed, it is put into a fixing solution known as Hypo. Some authorities claim that it should also be refrigerated since a high temperature will cause it to exert a stronger action and decompose into free sulphur. They also claim that it will cause the gelatin to swell and soften. We have found out from numerous tests that such is not a fact; that only the action of the developing agent in washing away the silver salts on the film will cause it to shrink or swell, depending on how much silver has to be reduced from the negative.

After the proper development and fixing, the film is dried and then photographically reproduced on a sensitized plate which is developed and then etched with acid to the required depth. This is followed by a series of etchings to reproduce faithfully the various tones and shades of the original photograph.

Methods of Cooling

The process of development has to be done in a dark room devoid of any daylight and illuminated by only a ruby bulb. As a result, there is very poor, if any, ventilation, and the temperatures in some of the dark rooms I have visited have reached as high as 100 degrees, which in itself is ample cause for warming the developer. In some localities operators have helped themselves by keeping tap water flowing around their developing trays mixing it with warm water in order to keep the proper temperature. We have only a short period during the year when tap water runs higher than 65 degrees, and on these occasions, many have used ice in the developer which weakens its action because of dilution.

In small towns the tap water may reach temperatures of 100 degrees, making it imperative that they use ice or else keep the developer in a refrigerator until ready for use. They then must wait until it warms up to 65 degrees, which method proves too uncertain.

If an operator uses either tap water, ice, or refrigerator, he has to be very alert in watching his solution temperature in order to obtain uniform results. Should it get too warm without his knowledge, his negative is worthless and has to be made over, thus causing a loss of time and material.

If he has a refrigerated developer where his temperature is automatically controlled and is constant, he can expose his photographic plate to the reflected light for a set exposure time, thereby not having to expose shorter or longer to compensate for varying temperatures. He can develop in a set time, not having to continually view the negative to see whether he is burning in too rapidly or not fast enough. His results are uniform, and the shrinkage or swelling of the gelatin is cut to a minimum.

S S S

WHAT TO DO NOW

NOW that winter is here once more, we are faced with the same old problem of how to profitably spend our time.

If you have maintained a case history of each of your customers in the past, a glance through the file will probably reveal enough work that you can sell in major overhauls, and so forth, to keep you busy all winter.

Failing this source of work, there is always the job of obtaining new customers, and the best manner of doing this is by making personal calls on each one. While you are making this call, it is a good plan to make a thorough survey of the equipment for future reference. Such information as you will obtain will be very useful when you receive your first call.

S S S

Harry G. Frame,
West Virginia.

We think your publication one of the best and have preserved every copy since becoming a subscriber.

David Bradfield,
Canada.

I have found this monthly issue on this kind of work very helpful and interesting and consider it a very important item that all us refrigeration men should have.

The Capillary Tube

EVERY type of refrigerating system must of necessity have two dividing points between high and low pressure. In an expansion system these points are the discharge valve and the expansion valve orifice; on a low-side float system, the discharge valve and the low-side float needle orifice; on a high-side float system, the discharge valve and the high-side float needle orifice. The dividing points between high and low pressure on a restrictor system are the discharge valve and the point at which restriction of the high pressure liquid begins.

In the capillary tube system, a receiver may or may not be used. Where it is used, it has but one function, and that is to act as a reservoir to store refrigerant when it becomes necessary to pump down the system. The entire liquid line in some cases is part of the capillary tube. The Frigidaire, though employing a restrictor, can be classed as a capillary tube system, because the construction of the restrictor is such that it performs in exactly the same manner.

Frigidaire Restrictor

The restrictor from the outside is no larger in diameter than a lead pencil. It is approximately four inches long and is silver-soldered to the evaporator. Inside the restrictor at the liquid line end, is a small conical shaped 200-mesh screen. The balance of the interior is filled with what might be described as a metal plug having small spiral grooves on its outer surface. These grooves, which are similar to threads on a bolt, are between the metal "plug" and the restrictor shell itself and the refrigerant liquid can get through the restrictor only by following the thread. Naturally, the more threads there are, the greater is the resistance to the liquid flow. The less threads there are, the more rapid the flow. The restrictor, in conjunction with a capillary tube liquid line, is all we have to hold back the high pressure liquid that is pumped into the receiver.

A restrictor or capillary tube system operates just the same as a high-side float job except that it "unloads" its high pressure at the end of each operating cycle. Sometimes this statement is confusing inasmuch as unloading or balancing pressure during the "off" period would lead you to believe that the high pressure equalizes with the low pressure—thus bringing the low pressure up higher than usual. Such is not the case, however, as you will understand in the following cycle of operation.

Operating Cycle

The unit begins operating when the thermostatic control cuts in. Refrigerant vapor is pumped through the discharge valve into the condenser where it is cooled and liquefied. This liquid passes into the receiver because of gravity and high pressure being introduced into the condenser by the pumping action. Since there is nothing to stop the liquid from going into the liquid line, it enters the liquid line and although slowed up because of the small line diameter, it rises to the restrictor. At the restrictor it meets further resistance but continues on through until it enters the evaporator. Once in the evaporator it boils off and goes down to be compressed and condensed all over again. When the evaporator temperature is reduced sufficiently, the control cuts out. Immediately following the cut-out, the high pressure begins to decrease due to heat leaving the condenser and receiver and also because compression has ceased. Of course, the liquid line is still unobstructed so liquid in the receiver can still pass into the liquid line and (as many servicemen figure) go on up to "warm up" the evaporator. Actually this does not occur. When the job is charged the quantity is so balanced that with the evaporator "full" there remains only about three ounces of refrigerant in the receiver. This small amount of liquid lies in the bottom of the receiver below the point where the outlet to the liquid line is located. Naturally, the line being open to the evaporator allows the pressure in the receiver to drop and the few ounces in the receiver will begin to vaporize. This vapor passes up the line and enters the evaporator and because of the large volume of liquid present there, the small volume of vapor is actually condensed and absorbed by the liquid with no noticeable increase in temperature or pressure. In

this manner, the high-side pressure in the condenser receiver will sink down during the "off" period to a point corresponding to room temperature or maybe less. Yet the pressure on the low pressure side will be just as it was on the high-side float system.

This type of system has several advantages. It eliminates the mechanical troubles of other metering devices. It also automatically meets demands for refrigeration by pushing liquid through faster when the compressor load increases and by putting it through slower when compression is not as great. And by "equalizing" pressure during the "off" period, the starting load on the motor will be lessened because the head pressure will have been reduced.

Service Operations

There is very little difference in operating characteristics between the high-side float and capillary tube systems, but the following will be noted:

1. The restrictor jobs will have slightly higher operating head pressures because liquid cannot pass out of the receiver into the evaporator as readily as with other metering devices. The back pressure, however, will remain practically identical with other types.
2. An overcharge of refrigerant on the restrictor job will evidence itself principally at the beginning of an operating period. During the "off" period, excess refrigerant will continue to pass through the restrictor and create a flooded condition. When the unit starts, liquid or dense vapor will be pulled out first causing frosting of the suction line.
3. A shortage of refrigerant will be indicated by incomplete frosting on the evaporator and if bad enough, poor refrigeration with excessive running time. Long running periods with good ice-freezing in lower trays and only fair box temperature will be encountered if the shortage is enough to reduce the refrigerant level in the evaporator below the level of the thermostatic switch bulb.
4. Adding refrigerant to a unit equipped with a capillary tube is probably the only service operation which changes, and the difference in this respect is slight. On a high-side system, the reaction on the evaporator is quite rapid, if you are charging by watching the frost line. On the capillary tube system, the refrigerant you add will not get to the evaporator as quickly because of the capillary tube and consequently, if you add gas too fast and go by the frost on the suction line, it may fool you due to liquid having backed-up in the receiver. Later, during an "off" period it will seep through and overload the evaporator with liquid. *Charge slowly* on the capillary tube jobs. If you are equipped to weigh the new charge, you may find it more practical to discharge the system and weigh in the proper amount.
5. Be very careful about dirt and moisture on a capillary system. Even though the jobs are well screened, dirt once lodged in the spiral grooves of the restrictor or in the capillary tube can cause a lot of trouble. Always be sure replacement parts, oil and refrigerant are clean. Also guard against the entrance of air and moisture. Air should be purged from the top of the condenser.

TO GREASE-PROOF BOXES

PAPER or wooden boxes may be made grease-proof by applying the following mixture utilizing the unique properties of glycerine, as presented in an authoritative British text:

Fish glue	16 oz.
Resin	2 dr.
Litharge	½ oz.
Kaolin	½ oz.
Glycerine	½ oz.
Water	40 oz.

Boil the glycerine, glue, litharge and part of the water together until solution occurs, then mix with the other ingredients. The liquid is applied to the inside of the cardboard or wooden boxes with a brush and allowed to dry. If necessary, the application may be repeated.

Mr. Bernard Chartier
Massachusetts

At this time I want to say how interesting your monthly issues on refrigeration are. I really appreciate them.

Mr. J. A. Kimmey
Connecticut

Enclosed find 1940 subscription. It is money well spent—keep me on your list as long as you print.

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment as well as oil burners to "The Question Box."

COMMENTS ON QUESTION 396

In the October issue of THE REFRIGERATION SERVICE ENGINEER, you recommend changing the snap action valve from the case to the cooler. The principal duty of a snap action valve on that application is not to control temperature but to control defrosting as the case coils do not defrost as rapidly as the cooler coils.

If the compressor completes an "On" cycle while the snap action valve is closed, the cooler coils may be cold enough to condense the vapor from the case coils for some time after the snap action valve opens, allowing the case to warm up; however, 10 degrees seems like a lot of warm-up due to this condition.

Since the extra coil is in the cooler, I would recommend using it and installing a constant pressure valve and check valve in the suction line to the cooler. This would permit controlling the cooler temperature, and due to excessive coil area, the coils would defrost readily and the check valve would allow the compressor to start refrigerating the case coils as soon as the snap action valve opens.

The other remedy would be to install a thermostat switch, such as the two element Ranco Type G-2, to control case temperature and coil defrosting, and use only the two coils in the cooler. I don't like a thermostat in a case because of the rough usage most cases get, which sometimes tears the thermal element off the switch.

There were a lot of this type job installed in this locality and a lot of experimenting with Frigidaire's A.R.V. Valve, etc., and it was this type job that showed the need for a valve of the snap action type to allow defrosting of the case coils. In those days, a ¾ or one h.p. compressor was sold to handle the case and cooler, and the job was thrown into the lap of the service department to make work. I hunted the soft side of many a Coca Cola case in trying to adjust one of these jobs, and when I thought I had it O.K. the weather would change or the butcher would get in his meat for the week end and the job would be back again, case coils all frosted up and case warm again. It was a good thing the jobs were not sold on as close a margin then as they are now or many a commercial dealer would have "gone over the hill." Now there are three or four ways to lick the job.—*H. C. Moore.*

CHARGING A CAPILLARY TUBE SYSTEM

QUESTION 401: Is it possible to move the condensing unit of a Kelvinator highside float job? I would like to take the unit out of a box and move it down to the basement, which would be about 25 feet from the evaporator.

This unit has a liquid line check valve at the evaporator, and a ¼-inch line from the highside float tank to this check valve. What I had in mind was to leave the highside float tank just where it is now and move the balance of the condensing unit to its new location. Would this be the more satisfactory move, or would it be all right to move the highside float tank with the condensing unit? Would the extra length of tubing of the liquid line have any effect on the amount of liquid delivered to the evaporator?

Also, in servicing a beverage cooler of a ¼-hp. capacity with a capillary tube for control, I don't seem to be able to judge when the unit is properly charged. I know when a unit is short, or overcharged, but when charging a unit, the system seems to get out of balance, and the frost line will at one time be close to the capillary tube, and the next time, it will just frost close to the end of the cooling coil.

I have been following this procedure: If a job is short — attaching my compound gauges to the suction and discharge shut-off valve on the compressor, I attach the drum of gas and then allow a small amount of gas to be taken through the suction valve. Then closing the drum valve, I shut the unit down,

allowing this extra gas to condense and pass through the capillary tube. This I watch on my compound gauge, and when I notice the gauges dropping down to saturated gas pressure, I start the unit again. But from then on the unit seems to go out of balance. The suction pressure doesn't seem to get down to normal and the frost line might be most anywhere or not at all, and the head pressure seems to build up too fast and too high.

If there is something I don't do, or if I do it wrong, or if I don't allow enough time between charging and the shut down period, please correct me and advise me as to the proper way to charge a unit of this type.

ANSWER: A Kelvinator highside float system can be installed in a basement without any particular difficulty being experienced. I would suggest, however, that the highside float be installed with the unit in the basement. Ordinarily, highside floats will operate much more successfully where they are maintained at the same temperature as the condensing unit. There can be considerable difference in temperature between the basement and the first floor.

The liquid line check valve, of course, should stay in its present location and the quarter-inch liquid line extended from there to the highside float in the basement. I don't believe that you need to be concerned about the extra length of liquid line, since the size of this line is ample for the size of the unit, even with a considerable length added to it.

Charging System

With regard to charging capillary tube systems, it is quite probable that you would have more trouble on beverage coolers than on the ordinary household refrigerator, and this is due primarily to the possibility of more surging in the evaporator. The procedure, of course, is to add refrigerant in the vapor stage and in small amounts till frost appears on the suction line. Sufficient time should be allowed then with the machine running during the entire charging period, to allow the charge to balance and permit the oil to be returned. And here is where, I believe, you are having your difficulty.

Whenever a flooded type system, such as the capillary tube type, becomes low on refrigerant, there is a tendency for oil to be trapped in the evaporator. Then, when you add gas to the system, this oil must be returned to the compressor in order to allow space for the additional refrigerant in the evaporator. As this oil returns, however, there will be a frosting on the suction line because of the fact that a certain amount of refrigerant is returning with it. If time is allowed, however, for this refrigerant charge to become settled in the evaporator, the frost line on the return line will gradually return. There will, of course, be a certain amount of fluctuation back and forth on the return line, but the average of this frosting point must be taken as the frost line. You will probably notice during this time, that the average frost line will move back closer to the evaporator, which is indicating the fact that oil is being returned and held in the compressor.

The refrigerant then can be added a little at a time until the frost line becomes more stable, and finally, when sufficient gas has been added, some refrigerant can be purged from the highside of the compressor until the frost line has been adjusted to the proper distance from the evaporator.

I would suggest, also, that rather than shutting down the unit during the time that you are adding gas, you keep the unit running at all times.

DRYING THE DRYER

QUESTION 402: Here are some questions regarding the use of dryers:

1. Please describe the process of "reactivating" activated alumina.

2. How can one be sure that the drying element of a dryer is moisture-saturated and needs to be changed?

3. Suppose a large dryer containing activated alumina is used on an SO_2 job, could it be used to dry a methyl or Freon system after drawing a vacuum on it?

ANSWER: The reactivating of activated alumina can best be done in a drying oven, using the same process as you would to dry out a refrigerating system. In other words, the dryer filled with the activated alumina should be connected to a vacuum pump, and a vacuum of at least 28 inches drawn on it, while at the same time, the dryer would be placed in an oven and held at a temperature of about 200 degrees over a period of several hours.

One other way, it can be done with more or less success by placing the activated alumina in an ordinary cook stove oven and spreading it out to a depth of not more than one-half inch in a shallow pan, and maintaining the oven at a temperature of about 225 degrees over a period of two or three hours.

In using this latter process, care must be

taken in handling the alumina after the drying has been done, to insure no moisture being absorbed during this handling period.

In answer to your second question, I believe the question should be stated in just the opposite manner; in other words, rather than saying, "How can one be sure that the drying element of the dryer is moisture saturated"? we should be concerned with the problem of "How can we be sure that the dryer is absolutely dry"? There is no way of telling from appearance when a drying agent is saturated with moisture, except in the cases of those drying agents which dissolve or powder to some degree when moisture saturated. Therefore, our only safeguard is to be sure at all times that the dryer is thoroughly dry. A dryer, of course, should never be used a second time once it has been removed from the system without reactivating or replacing the dryer agent.

As for those that are installed in a system, as long as the system continues to operate without trouble at the expansion valve, we can take it for granted that the dryer is still doing the job intended. Of course, in the case of systems that have been known to contain considerable moisture at the beginning of the drying process, it is wise to install a dryer for, say, a period of ten days to two weeks, then remove and replace, keeping up this exchange until all indications of trouble in the system due to moisture are removed.

Activated Alumina, which has been used on SO_2 can be used on other types of refrigerants providing it is properly reactivated before doing so. The reactivating, of course, would have to go through a great deal more process than merely drawing a vacuum, as you have stated. I believe the process outlined previously would also cover this point.

HIGH SIDE FLOAT TROUBLES

Question 403: Please give advice on the following refrigerator complaint:

Leonard Refrigerator	**Unit Part No. 12917**
50111	**L55 (or L53)**
Cab. 25130	**Serial 537955**

The refrigerator has a type of pressure regulating valve at the evaporator and has a high side float receiver with outlet line connected from the bottom of the receiver, and also from the side of the receiver about halfway up the receiver, with a valve at the point of junction.

The suction line frosts badly to the compressor, but the compressor does not sweat; the liquid line from the receiver to the control valve does not frost; the unit runs practically all the time giving only fair refrigeration. There was a whistle about the refrigerator for awhile, which has stopped since the suction line frosting began. The whistle seemed to come from the pressure regulating valve. The gas charge has not been changed since last fall. The refrigerant makes a vigorous boiling noise in the back of the evaporator. The unit does not seem to be running heavily.

Does the complaint sound like defective high side float, pressure regulator, a surplus of refrigerant or something else?

Answer: The two main symptoms of trouble you have given me on the Leonard refrigerator indicate one of two things; either the system is overcharged with refrigerant, or high pressure vapor is getting into the liquid line past the high side float.

The fact that the unit has not been serviced, or at least, the refrigerant charge has not been changed since last fall, and I take it for granted the system has operated satisfactorily during this time, would lead me to believe that the gas charge must be o.k., or at least it is not overcharged. Then, too, the fact that a violent boiling noise is heard in the evaporator seems to indicate that high pressure gas, or vapor, is entering the evaporator through the liquid line.

One of Two Troubles

This, then, would indicate one of two troubles, either the high side float is leaking at the float needle, or high pressure gas is being permitted to by-pass from the top of the high side float to the liquid line.

I don't seem able to definitely identify the refrigerator you have described, nor am I able to remember just what the side connection on the float is for; however, it seems that this may be a by-pass connection which would permit high pressure gas to be drawn off the top of the float and by-passed to the evaporator, or it could also be used as a means of pumping down the entire system and pumping the refrigerant out of the high side float.

If I am correct in this assumption, it is possible that the valve at the junction point of the lines, coming from the bottom of the float and from the side, may not be closed tightly against high pressure gas from the top of the float. If this valve is not closed tightly, high pressure gas can be discharged directly into the liquid line creating a condition that would be almost identical to a float that is defective or leaking. If

on checking this item, you find no trouble at this point, then I'd be of the opinion that the float is defective and should be replaced.

You are undoubtedly familiar with the fact that high side float systems should be charged until the frost appears on the suction line, then after the refrigerator has had sufficient time to become settled, some of the refrigerant should be purged off till the frost line returns to within two or three inches of the evaporator.

The pressure regulator you speak of is nothing more than a loaded valve in the liquid line, which creates a pressure difference between the inlet and outlet of the valve. Any trouble at this source would not make any difference in the operating conditions of the unit. It might possibly create frosting between the outlet of the float and the evaporator on the liquid line.

DOING THE BEST IT CAN

Question 404: Recently I exchanged compressors in a 1937 Kelvinator. The original compressor had been noisy ever since new, but the performance otherwise had been excellent. The running time had been four minutes and the off period thirty or better, according to the owner.

This model Kelvinator has a highside float, hence critical of the charge of refrigerant. With the new compressor, after recharging the running time was five minutes and the off period fifteen minutes. After purging some of the gas, the running time was brought down to four minutes and the off period up to twenty-five minutes. The box temperature is colder for the same setting of the control than originally with the old compressor. Each time that a little gas has been purged, the original performance has been approached a little closer. However, I am wondering if all refrigerators of the same model and size are always equal in performance. Will additional purging in this case bring up the box temperature and also cut down some more on the running time?

Answer: If you are able to obtain a running time of four minutes as against an idle period of twenty-five minutes, I would be of the opinion that you cannot improve on this Kelvinator refrigerator. It is quite possible that the customer is correct in making the statement that the machine ran four minutes and was off thirty minutes or better previous to the change of the compressor.

However, this running period was probably obtained during the cold weather, and now that the weather is warming up, it is hardly reasonable to expect the same running time. Most machines, as you know, are designed to run one-third of the time, and five minutes out of every thirty is much less than a third of the time.

If you still believe that there is some trouble in this system, I would suggest that you check to see if the compressor valves are holding properly, also that you check to see where the frost line ends on the return line from the evaporator. High side float systems, you know, are intended to be charged until the frost line appears on the return line, and then after the machine has run long enough so the charge becomes settled in the evaporator, gas should be purged off until the frost line returns to within about two inches of the outlet of the evaporator.

The fact that the temperature of the box is colder since the change of compressor seems to me to be an indication of a more efficient unit, and certainly, not anything to worry about.

SODA FOUNTAIN SERVICE

Question 405: I have an ice cream dispensing fountain about which I was asked, but the owners did not feel like placing any expense on it until they were sure about it, and as I could not tell them exactly what is wrong, I am taking the liberty to ask your idea as to the trouble. Following is the history of the case:

The case or fountain is an old Bishop-Babcock with a Frigidaire ½-hp. model "O" compressor, and the gas used is SO_2. It can handle 50 gallons of ice cream with a fresh water and soda water cooler in the bottle compartment. The case also contains 14 syrup jars and is brine-cooled or jacketed. The case contains one boiler in the fresh water compartment, and one each in the compartments on the ends for the brine, making a total of three boilers in the case.

Last winter, the compressor ran intermittently when the weather was cold, but now that summer is here, the compressor runs continuously and does not cool the ice cream compartments enough. There are leaks in the fresh water coils, but the taps do not leak. The ice cream compartments frost at their top edges, but very slightly on the bottoms, and do not get cold enough, as this should be around five above for good results. The test does not show that there is a refrigerant shortage, but it seems as if the compressor will not pump enough to give proper refrigeration. Pistons, rings, and valves are new.

I expressed the idea that the compressor may be too small for the heavy duty imposed on it in the summer time, but am not sure, and a rough test and check indicates that way, as it seems to me. The case is used quite hard for dispensing in the summer time. What do you think would be the probable cause of this?

Answer: There are three possibilities which may cause the trouble described, first of which is that the brine around the ice cream jackets has become weak through age. If this is the case, upon inspection, you will find that the evaporators submerged in the brine have a coating of ice around them. This ice will act as an insulator between the refrigerant and the brine and will not permit the transfer of heat as rapidly as originally intended.

Furthermore, under these conditions, it would be necessary to lower the pressure settings on the switch to such an extent that the machine will not operate as efficiently as it did originally.

A second result of weak brine is that the circulation may reverse as the brine becomes weaker and the temperature higher.

A second possibility of your trouble is oil being trapped in the low side coat evaporators. This would be evidenced by a very low suction pressure at the machine, and comparatively high temperature in the evaporators.

The third possibility, of course, is that the compressor is too small. However, it would seem that if this system has been operating for a number of years with the same set-up, the compressor has not been too small in the past, and therefore, should not be at this time, unless the load on the fountain has increased a great deal more than normal.

GIBSON LOW ON GAS

Question 406: I'm working on a 1935 Gibson household refrigerator model H5. The complaint on this unit is that it runs too long, high electric bill, and that the unit has a chattering noise.

I tried to test the highside, but there is no gauge port; instead, there is a screw plug purging port. Is there any way I can get the highside reading? I mounted the compound gauge and got a reading of 5 inches of vacuum and a 10 degree reading in the evaporator.

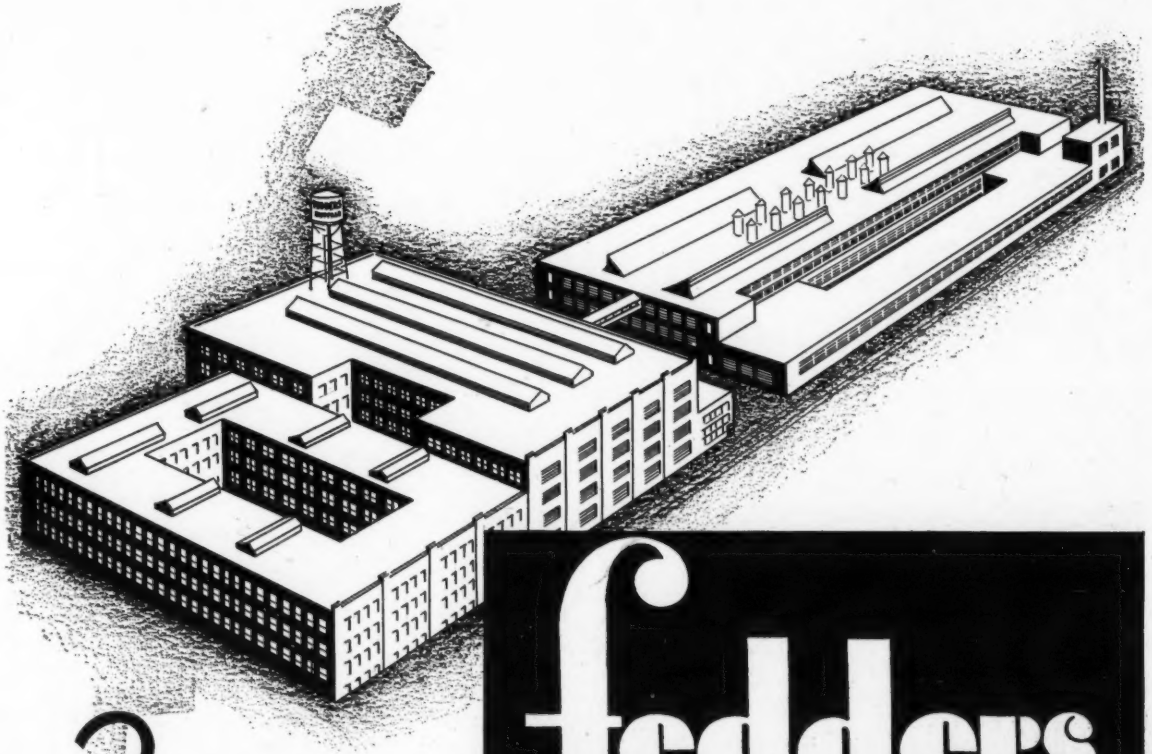
In looking at the highside float, I noticed that the liquid coming from the receiver tank is warm, but what I can't understand is that the small tubing which connects the highside float and the evaporator is colder than the suction line. Can it be that this float seat is partly clogged, and that it has the effect of an expansion valve? If this were so, then there would be a constant supply to the evaporator. If the liquid is constantly going in the evaporator, then why would the unit defrost on the on cycle? The customer claims that this defrosting is not a regular incident. Could it be that the float valve would be chattering? Any suggestions that you may be able to give me on this subject will be greatly appreciated.

Answer: In order to test the highside pressure on the Gibson household refrigerator it will be necessary to secure one of the adaptor sets sold by most jobbers which permits you to take pressure readings or charge almost any hermitically sealed unit. These adaptors fit on the screw plug purging port and give you a means of attaching a gauge.

On the high side float system, it is perfectly normal for the liquid line to be colder than on other types of systems. This is because expansion of the gases begins at the outlet of the float, and unless the tubing is of very small size, or is insulated, this liquid line will even freeze under normal operation. Because of this fact, it is usual practice to insulate the liquid line.

I am inclined to believe that your trouble on this system is a lack of refrigerant, although there is the possibility also that the float is leaking. I would suggest as a first trial that you add refrigerant to the low side of the compressor as in any other system until this suction line begins to frost. This will give you the indication that the evaporator is entirely full of refrigerant and is beginning to spill over in the return line. After the system has had sufficient time to run and allow the refrigerant to settle, or properly balance throughout the system, then the refrigerant should be purged off from the high side until the frost line on the return line returns to within about two inches of the evaporator.

The purging should always be done from the top of the float, which will insure the removal of air at this point, if there is any in the system, and it has less inclination to unbalance the system, so that you will get a false indication of frost on the return line. If you get a continued indication of defrosting on the evaporator while the unit is operating, then I would suggest that the high side float be either repaired or replaced.



2 GREAT PLANTS in Gear

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These two modern factories are concrete proof of Fedders service to industry . . . to transportation . . . to defense . . . to

AUTOMOTIVE RADIATORS ★ AUTOMOBILE HEATER CORES

1940 R.E.M.A. Fall Meeting

EXCEEDING in interest and attendance any previous meeting held by the Refrigeration Equipment Manufacturers Association, the 1940 fall meeting of the Association was held October 9, 10, and 11 at the French Lick Springs Hotel in French Lick, Indiana.

With seventy percent of its member companies represented at the meeting, the first day was devoted to meetings of the various Association committees, as well as to meetings of the respective Relations Committees of the R.E.M.A. and the other associations who participate in the All-Industry Refrigeration and Air Conditioning Exhibition. Details were completed to carry out the final activities and promotional work for the coming All-Industry Exhibition in Chicago in January.

On Thursday, the business of the Association got under way with the call to order by E. A. Vallee, Vice-President and Sales Manager of Automatic Products Company and President of R.E.M.A. The first address was by Phillip P. Gott, Manager of the Trade Association Department, U. S. Chamber of Commerce, Washington, D. C. Mr. Gott interestingly outlined the value of trade association work in the industries which they represent, and related the scope of the activities of other associations in maintaining and encouraging accepted standards of practice, as well as research work.

N. J. MacDonald, Vice-President, The Thomas and Betts Company, Elizabeth, N. J., delivered an inspiring address on "The Wholesaler—Our Partner in Business," enumerating the elaborate plan which his company has adopted in assisting its wholesalers in the marketing of T. & B. products. Mr. MacDonald presented to those in attendance an attractive brochure outlining the entire plan.

Probably one of the most important committee reports was that presented by William C. Allen, Vice-President, Modern Equipment Company, and Vice-President of the Association. His Committee recommended the adoption of some clarifying amendments in the procedure of the Association's "Information Service on Distribution Outlets" through which the Association as-

ORDINARILY when the head pressure of a refrigerating machine ***seems*** to be too high the service engineer ***pumps the system down*** and purges by cracking the purge valve open. He ***hopes*** that the air and other non-condensable gases are concentrated near the purge connection. He ***tries*** to allow all of these non-condensables to escape without the loss of ***too much*** refrigerant.

With the "Little Giant" Purger the chance conditions—the ***seems***—the ***pumps down***—the ***hopes***—the ***tries***—and the ***too muches***—in fact, all the doubts—are eliminated. He ***knows definitely*** whether or not the system needs purging. If purging is needed it can be accomplished without interruption of the plant operation. He ***knows*** that non-condensable gases are concentrated at the purger. He can ***positively expel*** them without an appreciable loss of refrigerant.

Here are the

Advantages of Purging With The "Little Giant"

NO GUESSING— Positive indication when purging is necessary —the sight glass gives visible evidence of non-condensable gases in system.

NO REFRIGERANT LOSS— The air in the system is completely separated from the refrigerant before the purge valve is opened.

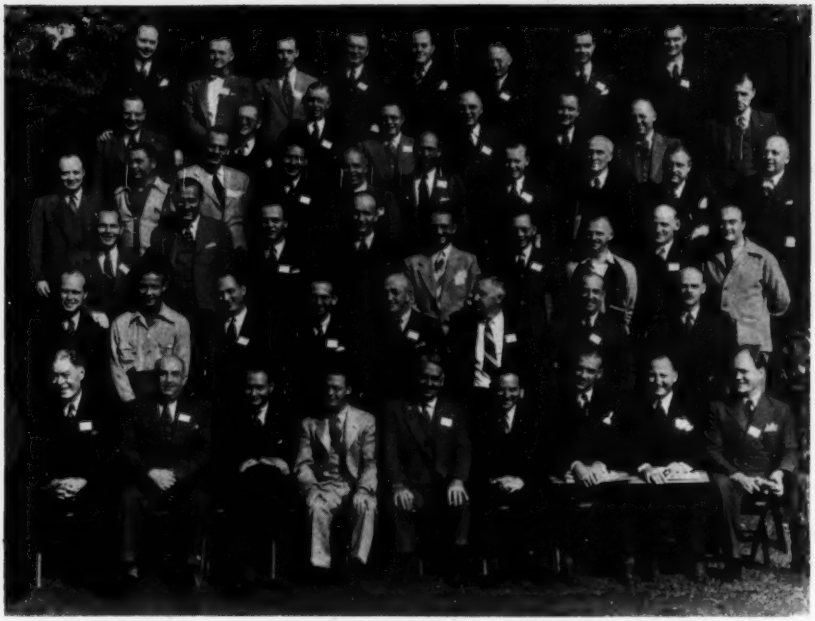
SIMPLE TO OPERATE— All operating valves easily accessible. Not necessary to check pressures or temperatures. No need to shut down the system.

POWER SAVINGS— Power savings, due to a reduction in head pressure will pay for the "Little Giant" many times over.

MANUAL OPERATION— Fully manually operated, there is no possibility of a slow leak developing which would cause a loss of refrigerant before cause is discovered.

THE Little Giant **Purger** is mounted on a solid oak panel and can be conveniently fastened to the wall or to other suitable locations. Write us for full particulars and instructions for installation and operation. Order through your jobber.

MUELLER BRASS CO.
PORT HURON, MICHIGAN



R.E.M.A. MEMBERS WHO ATTENDED A RECENT BUSINESS MEETING AT FRENCH LICK, IND.

Even though all those in attendance at the R.E.M.A. meeting are not included in this view it is proof of the turnout the meeting enjoyed. Those shown above are left to right, front row: R. M. McClure, Executive Secretary Refrigeration Equipment Mfrs. Assoc., Chicago, Illinois; W. D. Keefe, Fedders Manufacturing Co., Buffalo. N. Y.; Hammond E. Chaffetz, Attorney, Chicago, Ill.; Stuart G. Phillips, Dole Valve Company, Chicago, Illinois; Philip P. Gott, U. S. Chamber of Commerce, Washington, D. C.; N. J. MacDonald, Thomas & Best Company, Elizabeth, N. J.; E. A. Vallee, President R.E.M.A., Automatic Products Co., Milwaukee, Wisconsin; J. S. Forbes, Superior Valve & Fittings Co., Pittsburgh, Pa.; George Taubeneck, Business News Publishing Co., Detroit, Michigan.

Second row: Phil Redeker, Business News Publishing Co., Detroit, Michigan; J. W. Krall, Detroit Lubricator Co., Detroit, Michigan; J. E. Jernberg, Mills Novelty Co., Chicago, Illinois; A. B. Schellenberg, Alco Valve Company, St. Louis, Mo.; W. C. Allen, Modern Equipment Corp., Defiance, Ohio; R. M. Van Vleet, Cutler-Hammer Company, Milwaukee, Wisconsin; Robert LeBaron, Virginia Smelting Co., West Norfolk, Va.; Frank R. Pond. Refrigeration & Industrial Supply Co., Minneapolis, Minnesota.

Third row: M. R. Oberholzer, L. H. Gilmer Co., Philadelphia, Pa.; M. H. Pendergast, Modern Equipment Corp., Defiance, Ohio; J. Norbert Ott, Henry Valve Company, Chicago, Illinois; C. V. Gary, Henry Valve Co., Chicago, Ill.; F. J. Hood, Ansul Chemical Co., Marinette, Wisconsin; S. R. Robinson, Bonney Forge & Tool Works, Allentown, Pa.; F. A. M. Dawson, Refrigeration Supplies Co., Ltd., London, Ontario, Canada; C. C. Ryan. Dole Refrigerating Machine Co., Chicago, Ill.; K. B. Thorndike, Detroit Lubricator Co., Chicago, Illinois.

Fourth row: John Wyllie. Jr., Temprite Products Corp., Detroit, Michigan; F. K. Smith, Tecumseh Products Company, Tecumseh, Michigan; J. A. Strachan, Kerotest Manufacturing Co., Pittsburgh, Pa.; L. C. McKesson, Ansul Chemical Company, Marinette, Wisconsin; Clark Bridgman, Bush Manufacturing Co.. Hartford, Conn.; Barrett Scudder, Jas. P. Marsh Corporation, Chicago, Illinois; C. H. Benson, Imperial Brass Mfg. Co., Chicago, Illinois; Wm. A. Leonard, Imperial Brass Mfg. Co., Chicago, Illinois; Frank J. Gleason, Copeland Refrigeration Co., Sidney, Ohio; H. W. Jarrow, Jarrow Products, Chicago, Ill.

Fifth row: H. T. McDermott, Refrigeration Service Engineer, Chicago; G. E. Graff, Ranco, Inc., Columbus, Ohio; A. J. Meyer, Ranco, Inc., Columbus. Ohio; A. B. Newton, Minneapolis-Honeywell Regulator Co., Minneapolis, Minnesota; G. Russell Whippo, Weatherhead Company, Cleveland, Ohio; E. C. Eickhoff. Chase Brass & Copper Co., Waterbury, Conn.; Gordon A. Burns, Pres., Refrigeration Service Engineers Society, Toronto, Ontario, Canada; David Fiske, Sec'y., A.S.R.E., New York, N. Y.

Top row: M. W. Knight, Peerless of America, Inc., Chicago, Illinois; Ivan Corcoran, Sqaure D Company, Detroit, Michigan; Otto C. Wilk, Weatherhead Company, Cleveland, Ohio; L. F. Blough, White-Rodgers Electric Co., St. Louis, Missouri; M. E. Miller, Peerless of America, Inc., Chicago, Illinois; E. J. Zoll, Chicago-Wilcox Mfg. Co., Chicago, Illinois; J. M. Dumser. Chase Brass & Copper Co., Waterbury, Conn.; Fred Riggin, Jr., Mueller Brass Company, Port Huron, Michigan.

In addition to those pictured, the following members and guests were also present: B. H. Clark, B. H. Clark Co., DeKalb, Ill.; J. W. Baillie, Detroit Lubricator Co., Detroit, Michigan; E. W. McGovern, R & H Chemicals Dept., Wilmington, Delaware; H. L. Beekley, Electrimatic Corporation, Chicago, Illinois; Paul Penn, Penn Electric Switch Co., Goshen, Indiana; W. T. Carmody, Spoehrer-Lange Company, St. Louis, Missouri.

"I Married a Smart Husband He's a G-E Dealer!"

Mrs. D. Kerwin Twomey, wife of successful G-E Dealer of Biddeford, Maine, tells you how she feels about being a member of the great G-E family.

"WHY AM I TALKING about my husband's business? Simply because I'm mighty interested in it. I like it. And I know a lot about it because we've always made it a habit to talk things over together. We're really partners.

"He's proud of his success . . . and I am too!

Commercial Refrigeration

"As he says, every time he sells a G-E unit he makes another friend.

"I don't believe I know a soul who hasn't a refrigerator, a fan or something made by G-E. That's why he says it's easy to get to prospects and why they're *sold* on the name and reputation of General Electric.

Cooling

"And he enjoys working with his distributor and the company representative. They give him a lot of special training and they are always handy when he needs help. They supply him with all kinds of literature and promotion material. And of course he benefits by the grand advertising G-E does.

"G-E is the finest money can buy—

"When my husband sells a G-E walk-in cabinet or any of the other refrigeration or cooling equipment or a G-E furnace he *knows* he is giving his customers the finest they can buy.

"I know G-E engineering and research couldn't produce anything but the finest. And that's what my husband tells customers—that *convinces* them.

"He doesn't get called out of bed at all hours because something's gone wrong. And besides, he's been all through the special technical training provided by G-E. That means installations are right to begin with.

"We live very comfortably

"Of course my husband is in business to make money—and he does. Naturally he handles the complete lines—G-E Commercial Refrigeration, Cooling and Heating.

"He says they are the most complete lines in the business. No matter what prospects want he usually can supply them.

"He carries what he calls a skeleton line. This keeps inventory costs down because he can get whatever he needs in a hurry, from his distributor.

"This gives you some idea what it means to be a G-E Dealer.

Heating

You can be a G-E Dealer if you can fill certain requirements. For year'round profits, fill in and mail the coupon today.

GENERAL ELECTRIC

GENERAL ELECTRIC CO.
Division 199-671, Bloomfield, N. J.

I want all details on the G-E Dealership for my territory.

*Name*_____

*Street*_____

*City*_____ *State*_____

sembles and furnishes information with respect to the manner in which the various members have classified, according to the functions which they perform, the distribution outlets with whom they have been doing business, and to furnish credit and other pertinent information concerning such outlets. After a thorough explanation by Mr. Allen of the proposed amendments to the plan it was unanimously voted to approve the changes recommended.

Mr. F. S. Langsenkamp, President of the National Refrigeration Supply Jobbers Association, presented some figures relative to an average jobber operation to point out that the manufacturers should determine whether or not the volume of business warrants the establishment of additional jobbers in certain localities.

The banquet on Thursday evening provided the necessary relaxation from the activity of the meeting, and the talent furnished by Ivan Corcoran of the Square D Company, and W. D. Keefe, of Fedders Manufacturing Company, who established his reputation as "Professor Quiz", proved entertaining and profitable to those who were fortunate enough to provide the right answers to the various questions.

Friday

On Friday morning, two interesting papers were presented; the first on "Requisites for Success in a Jobbing Business," by J. W. Baillie, Secretary-Treasurer of Detroit Lubricator Company, was a valuable contribution to the wholesaler in assisting him to check up on his own business operations. His presentation indicated a thorough study and complete knowledge of the subject.

Stuart G. Phillips, Advertising Manager, Dole Valve Company, did an excellent job in presenting "Cold Facts and Hot Ideas—What Advertising Can Do for You," giving some unique and interesting ideas on the value of advertising to the manufacturer and how the fullest advantage can be taken of all forms of publicity, ranging from trade paper advertising down to trade show exhibits.

At the conclusion of these two papers, several important committee reports were made, and M. W. Knight, Sales Manager of Peerless of America, and Chairman of the Exhibition Committee, reported that 160 exhibit spaces had been sold for the show in January, which exceeded at this date the number at the last exhibit. Several interesting plans for promoting attendance at the exhibition were also outlined.

Contact Committee Reports

Mr. John Wyllie, Chairman of the R. S. E. S. Relations Committee, presented his report, and particularly stressed the cordial relations existing between the two associations and the desire upon the part of the R. S. E. S. to maintain this relationship. He gave the results of the committee conference held on Wednesday.

Proceeding with the discussion by the membership for the holding of the 1942 convention, it was finally decided that two committees would report on the desirability of continuing the showing in Chicago and the alternating of the convention to the East, this information to be presented to the membership for a referendum vote as to the preference of the members. The final decision will be made by the Board of Directors of the Association.

A. J. Meyer of Ranco, Inc., reported to the meeting the accomplishments of the Credit Division of R.E.M.A. and that practically all of the members are participating in this service.

Past President, J. S. Forbes, of Superior Valve and Fittings Company, Chairman of the Jobbers Relations Committee, reported on the various requests made by this group.

Because of the success of the meeting, French Lick was agreed upon as the location of the next spring meeting. In addition to attending to the business of the Association, many of the members also took advantage of the excellent facilities offered by the hotel to golf, ride and do some skeet shooting.

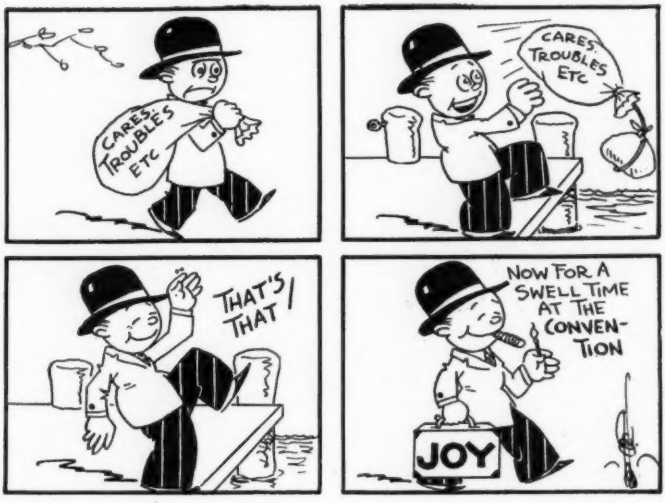
7th Convention Plans in Full Swing

THE time is drawing close to the dates of the 7th Annual Refrigeration Service Engineers Society Convention in Chicago on January 13 to 16. Everyone interested in the field of servicing and installing refrigeration equipment is invited to participate in the educational program which is now nearing completion. Full details of the program will be published in the December issue.

The entire three days will be packed with informative educational talks by the leaders in their respective businesses, who will give you pertinent information as to the operation of your own business. As at former conventions, the program is being arranged to provide ample time for a thorough and complete inspection of the exhibits. This year the number of exhibits will be greatly increased, and it is expected that 25 per cent more exhibits than last year will be on "dress parade" in the largest exhibit of refrigeration equipment, supplies, and accessories ever displayed.

New innovations will be introduced in the conduct of the educational program, and an open invitation is extended to all service engineers to come and bring your problems with you. Be in Chicago and enjoy the fellowship of service engineers who will attend from all sections of the country. Exchange ideas and experiences, and get firsthand information on the current trends as they may affect your business.

You owe it to yourself to make this business investment. Plan now for your convention trip to Chicago. You will find that it will be one of the best investments you have made in furthering your business advancement, and you can capitalize on it throughout the entire year. The dates—January 13-16—Stevens Hotel, Chicago.



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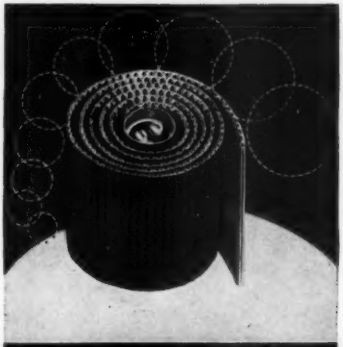
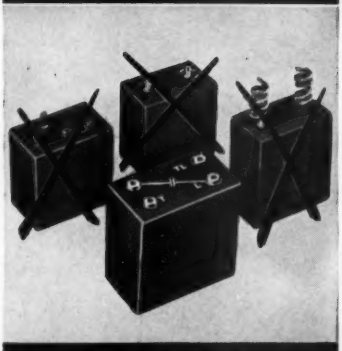
MALLORY Universal AC CAPACITORS

will reduce your inventory more than half



ANY NEEDED DIAMETER OR HEIGHT IN A MATTER OF SECONDS



ONE CAPACITOR REPLACES ALL THREE

Here's the greatest news about Motor Start Capacitors to ever hit the replacement field. Now replacements are completely simplified and your inventory investment to cover *every need* can be reduced as much as one-half to two-thirds. Round types MSU are all housed in the smallest diameter and shortest height metal container possible. Around each is wrapped a specially developed "size adjuster" providing a top diameter of 3" and a maximum height of 4¾". This corrugated adjuster is clearly calibrated for all smaller diameters and heights. You simply trim it at the desired point for a perfect fit.

Rectangular types MSG and MSF are each packed with complete hardware to cover every installation need. Mallory Universal AC Capacitors will cost you less and reduce your stock investment. Mallory's reputation in the Capacitor field is your guarantee of quality.

Send for Catalog

Write today, giving your distributor's name, for Catalog M-801 for complete details and replacement recommendations.

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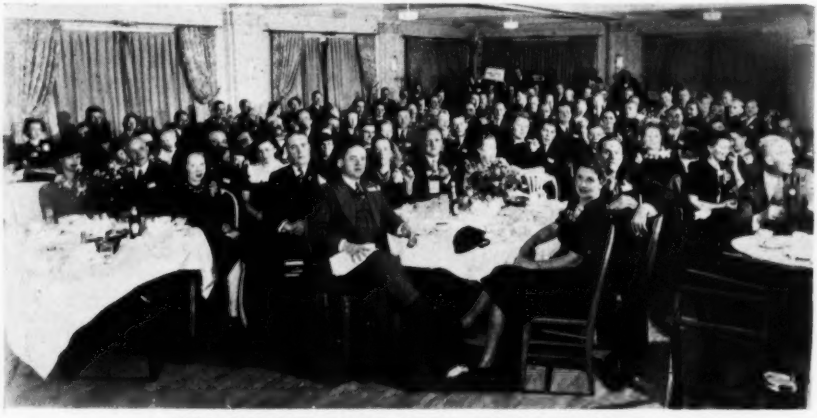
In these views taken by Irving Alter at the Illinois State Association Convention in Peoria are shown upper left—R. C. McCarthy, past president and C. L. Hartman, newly elected president. Upper row—A portion of the speakers' table at the banquet. Center row—The morning lineup outside the hotel. Bottom row—Views of the meeting.

ILLINOIS STATE ASSOCIATION ANNUAL MEETING

SATURDAY and Sunday, October 19 and 20, the Illinois R.S.E.S. State Association held its annual meeting in Peoria, Illinois. Perfect weather during the two days, combined with the efforts of a hard-working committee, brought out a representative crowd from chapters in this and neighboring states. The greater part of the business and educational program was divided between two main meetings on Saturday afternoon and Sunday morning.

Saturday morning a brief meeting was called for the purpose of officially opening the annual session and appointing committees. Saturday afternoon the meeting came



ILLINOIS STATE ASSOCIATION ANNUAL BANQUET

"I find it hard to do without," so says this service man

• Now that the Calculator is being put to the test of practical use in the field, we have had a number of letters from service men testifying to its value. This one is typical.

Raton, N. Mex.

Enclosed please find $1.00, please send me your Head-Back Pressure Calculator.

I lost mine and find it very hard to do without.

Yours truly

Merle Rankin

WRIGHT'S

H. B. P.

CALCULATOR

The purpose of the Head-Back Pressure Calculator is to quickly determine the proper head pressure, for the following refrigerants when the suction pressure, room temperature or mean water temperature is known.

Carrene	Methyl
Isobutane	Freon or F-12
Sulphur Dioxide	Ammonia
Carbon Dioxide	

Actual Size 3½" x 3½".

A Vestpocket Tool Every Service Man Should Carry

A number of troubles can be detected by comparison of the existing head pressure and what the head pressure should be, but in the past there has been no convenient method available to the service engineer to determine what the correct head pressure should be. Such variable conditions as the suction pressure, room temperature, water inlet and outlet temperature, kind of gas used, etc., all determine the proper head pressure. It is not practical to depend on one's memory of other similar conditions or to just use snap judgment when this handy calculator gives you the correct answer so easily. Send for it today! Sturdily constructed, with oil-proof finish, for on-the-job use.

POSTPAID $1.00

NICKERSON & COLLINS CO.

435 N. WALLER AVE., CHICAGO

to order with the invocation, followed by a report of the nominating committee. On the educational program, William Gauger of Commercial Coil and Refrigeration Company, Chicago, presented a paper entitled, "Cooling Water for Bakeries and Bottling Works."

James Cernohouz of Clyde Woodworking Company, Chicago, was next on the program with an enlightening paper on the subject of "Refrigeration in Photography."

A short business session followed the educational program, during which the election of officers took place. Those elected were: C. L. Hartman, President; R. M. Potter, 1st Vice-president; Floyd Duvall, 2d Vice-president; L. P. Millen, Secretary; A. D. McGill, Treasurer; Leslie Sturch, Sergeant-at-Arms.

The ladies were then invited to join the men in viewing a sound film entitled, "The

C. L. HARTMAN, *President*

Middleton Family at the World's Fair." While this picture does not deal with refrigeration, it is a thoroughly enjoyable educational film of general interest.

Saturday evening the annual banquet and dance got an early start and continued to a very late hour in the morning. The food was excellent and in ample portions. Community singing and music by the orchestra provided entertainment during the dinner. A floor show, followed by a dance, occupied the balance of the evening.

On Sunday morning the meeting was called to order by the new president, C. L. Hartman, and the first educational item was a historical paper entitled, "Air Conditioning in its Infancy," by Roy Davidson.

Next on the program was a demonstration of gas masks by J. R. Fleming of the Mine Safety Appliances Company, followed by a

quiz contest, conducted by H. D. Busby, in which W. C. Metcalf won first prize.

The subject of truck refrigeration was next discussed by a representative of The Carrier Corporation. Carrier has developed a motor-driven unit which may be installed in any part of the truck, thus providing a completely self-contained unit, fully automatic and not in any way dependent on the motor of the truck itself.

The final business session occupied a short period following the educational program, and the meeting was adjourned shortly after noon.

There were many ladies present, and their time was well planned for, with various entertainments arranged by the Ladies' Committee. The entertainment included a sightseeing trip through beauty spots of the city, a card party during one afternoon, and, of course, the annual banquet and the showing of the motion picture entitled, "The Middleton Family at the World's Fair."

Are you looking for more business in your shop ???

★ Well, if you are, and who isn't, here's the way to get it. Go after that Hermetic servicing that you can undoubtedly get in your territory. *Herveen,* the replacement gas for Frigidaire Meter-Misers, enables you to do this. As the demand for Hermetic servicing increases it becomes more and more profitable for the well-equipped shop to handle this work.

HERVEEN
brings in business

★ Why not plan to get this profitable extra business for yourself? Refrigeration jobbers all over the country now handle *Herveen,* if yours doesn't, write us direct.

MODERN GAS CO., Inc.
Manufacturers and Refiners
1084 Bedford Avenue, Brooklyn, N. Y.

NEW YORK STATE ASSOCIATION ALL SET FOR CHARTER MEETING

THE officers and Board of Directors of the newly formed New York State Association of the Refrigeration Service Engineers Society met in Albany, New York, on October 6. New York State President, John K. Bush, presided, and those of the Executive Committee present included: George Gardner, Secretary; and E. Phillips, Sergeant-at-Arms, with the following Board of Director members: Ralph Davis, Buffalo; E. J. Walters, Schenectady; E. E. Condon, Flushing; S. B. Garland, Springfield, Mass.

Announcement was made of the committees appointed for the Charter Meeting of the New York State Association, which include the following:

General Local Committee — George B. Gardner, Chairman, Schenectady, N. Y.; E. J. Walters, Schenectady, N. Y.; Joseph Dayton, Schenectady, N. Y.

Program and Exhibit Committee—John K. Bush, Chairman, Buffalo, N. Y.; Ralph Davis, Buffalo, N. Y.; E. C. Wilkinson, Schenectady, N. Y.; Kenneth W. Smith, Albany, N. Y.

Educational Committee — E. E. Condon, Chairman, Flushing, N. Y.; A. Walters, Schenectady, N. Y.; A. H. Coutant, Kingston, N. Y.

Registration Committee — D. Roger Pitman, Chairman, Cohoes, N. Y.; A. H. Cou-

tant, Kingston, N. Y.; C. H. Dutton, Middleburg, N. Y.

Entertainment Committee — E. Phillips, Chairman, Rockaway Beach, N. Y.; Leo Helmbold, Kingston, N. Y.; Ralph Feathers, Troy, N. Y.

Mrs. Leo Helmbold, Chairman, Kingston, N. Y.; Mrs. George B. Gardner, Schenectady, N. Y.; Mrs. Ralph Feathers, Troy, N. Y.; Mrs. E. J. Walters, Schenectady, N. Y.

The committee discussed the several proposals that had been introduced relative to the arrangements for this first state meeting. Probably the most important feature of the convention is the educational program, and the report was presented by E. E. Condon, Chairman, who advised that the program was now practically complete. The other committee chairman briefly outlined the work that had been accomplished, and with the work accomplished, it is anticipated that the success of this association meeting will be fully assured.

Extensive plans have been made for the entertainment of the ladies who will be present, and on Friday, a luncheon will be given, with a tour of the Educational Building in the afternoon. Additional activities on Saturday morning have been planned.

Chapter Notes

Under this heading will appear news of the chapter meetings. For names of the officers and dates of regular meeting nights, please refer to the Chapter Directory.

SCRANTON CHAPTER

October 1—The regular meeting was held in the Chamber of Commerce Building, and after a brief business session, there was a showing of Herman Goldberg's colored movies taken at the 1940 convention in Chicago.

Immediately following this showing, a discussion arose on tentative plans for attendance at the next convention. It was decided that the Scranton Chapter should definitely take part in these plans. Among the promotional activities of the chapter was a letter sent to all prospective or past members of the chapter, outlining its activities in recent meetings and designed to create more enthusiasm among the local service engineers.

ATLANTA CHAPTER

October 4—After the bills incurred by the chapter had been passed for payment, it was decided that the chapter should pay the dues of any member in good standing, called to

the colors, for the duration of his term of service.

On the educational program for the evening, C. P. Lee, Chief Engineer of Larkin Coils, Inc., discussed the new Larkin Over-Draft unit cooler and the new beverage cooling unit. The talk proved informative and was enjoyed by all those present.

A committee was appointed to compile prices of various service items and to present them in printed form fully corrected for distribution to the members. The committee appointed are: Joe Stephens, Chairman; Charles Biggers; Dave Galloway; and Thomas L. Carnell.

October 21—The meeting was held in the Imperial Hotel and was started off with a big steak dinner.

Considerable time was spent in the discussion of various service charges considered fair within the territory. These prices were compiled into a final form for printing.

LONE STAR CHAPTER

October 7—After the minutes of the previous meeting had been read, C. W. Barron gave a report regarding a regular meeting place. So far a permanent place has not been secured, but the Dallas Power and Light Building is under consideration, and there is a possibility of the meetings being held there once a month. The matter is to be investigated further and a report given at the next meeting.

A great deal of discussion arose regarding prices to be charged for service among the members, and the meeting went on record as being heartily in favor of fair prices for all service, work, and materials.

On the educational program, a quiz contest was held in which two teams were chosen. The Bearcats won over the Wildcats, with a score of 21 to 19, and every one enjoyed the contest quite thoroughly. It was the opinion of the members that such programs should be repeated in the future if further contests can be secured.

Credit for having planned and installed one of the first Dole plate equipped locker storage plants in the Dallas area goes to H. W. Cline, President of the Chapter, and of Southern Refrigeration Company of Dallas. The installation was made in the Luttrell Foods Market at Arlington, formerly nationally famous as the site of Arlington Downs.

Appointment of A. T. McCary, a veteran service engineer with an excess of sixteen years' service in Texas and Oklahoma, to the post of supervising engineer for the Brunswick, Balke Collander Company, with headquarters in Dallas, has been announced by C. M. Wright, manager of the Dallas factory

branch for the company. Mr. McCary is a member of Lone Star Chapter. The new territory which will be his will include all of Texas, save the Panhandle area, and seven counties in New Mexico. His job will be to supervise installation and servicing of every major installation by the company in the territory, and the naming of resident service men for lesser installations. The job will give Mr. McCary full responsibility for this part of the company's operations. The appointment is a part of a program providing a point of responsibility for every installation made.

October 14—The meeting was called to order by H. W. Cline, President, and plans were discussed for a luncheon or dinner meeting to be held at some date in the near future to open a new drive for membership. Details for arrangements for this gathering were left in the hands of the entertainment and educational committees. It was suggested that an amateur program be arranged for the occasion. Suggestion was made that the chapter seek to undertake presentation of a series of comedies through the fall and winter season, and that possibly, some revenue might be derived from them by making the presentations available to PTA groups. The committees were charged with responsibility to investigate the feasibility of the proposal.

It was proposed that individual members be assigned subjects for open discussion, dealing with the various phases and practices of service engineering. The educational committee will make report on its study of this suggestion in the near future. The opinion of the members was that with the rush season for service engineers ended, time was ripe for the chapter to speed up a program which will have general educational value to the group.

ONTARIO MAPLE LEAF CHAPTER

September 27—Bill Marshall, chairman of the Educational Committee, asked for the opinion of the members on educational programs for the coming season. He pointed out that it would be necessary to have a definite decision immediately in order to have sufficient time to arrange a program for this season. It was also asked that a decision be made as to whether or not the meetings should continue on Friday nights or be changed to some other date, to accommodate members now engaged in military training.

Considerable discussion was created by the introduction of a booklet published by the Cleveland Chapter, containing suggested prices for service operations. Mr. Burns, National President, spoke at some length on what could be expected at the All-Industry Show in Chicago, January 13-16. Mr. Donnell expressed the opinion that the question

of an official delegate to the Chicago convention should be settled immediately. Mr. Burns volunteered to determine whether or not the government would allow money for a delegate to attend the convention.

October 11—The question of the second annual Canadian Convention was raised, and after considerable discussion, it was moved by F. Strong and seconded by George Tyndall that a committee be appointed to find out whether or not the chapter can expect the support of the manufacturers and jobbers in this territory, and if so, proceed with convention arrangements, this committee to bring in a full report at the next meeting.

Art Doan introduced Prof. Wilhelm of the University of Toronto, who gave an interesting lecture and demonstration on liquid air, its uses and applications. This demonstration was thoroughly enjoyed by all those present, and Prof. Wilhelm was given a hearty vote of thanks for his presentation.

October 25—The election for a delegate to attend the Chicago convention was held at this time, with the result that F. C. Strong was elected delegate and W. Marshall alternate delegate. It was voted that the chapter furnish $25 towards the expense of each delegate.

After some discussion, it was decided that an international meeting be held in Hamilton on December 13, invitations to be sent to the London, Buffalo, Montreal, and Ottawa Chapters, and $75 be taken from the 1940 convention funds to cover the evening's expenses.

On the educational program for the evening, Mr. W. Smallwood gave an interesting talk on absorption systems, using a working model for demonstration purposes.

TRI-STATE CHAPTER

October 21—By a vote of the members present, it was decided that the meeting dates of the chapter should be changed from the first and third Mondays of each month to the second and fourth Tuesdays of each month. A new educational committee was appointed, consisting of A. W. Gruber, Forrest Poole, and John Smoot.

No educational program was arranged for this evening, and the greater part of the evening was spent in a round table discussion, after which all the members adjourned to the home of Claude Brunton for a wiener roast, in which the wives of the members joined.

TRI-COUNTY CHAPTER

September 20—Included in the business conducted during the evening was a discussion on future meetings. Also discussed were the possibilities of the chapter's being host at the State Convention in 1941. The

secretary was asked to order 100 Christmas cards to be sent to all chapters and National Officers during the Christmas season. The educational program for the evening consisted of a quiz contest furnished by the National Society.

October 4—The first order of business for the evening was a vote by the members to determine who would represent them on the State Association Board of Directors. The vote resulted in the election of Clarence Stumpf as the delegate. In keeping with the chapter's wish that it should be host to the State Convention in 1941, the delegate was instructed to ask for this privilege at the Convention in Peoria on October 19-20.

WESTERN MASSACHUSETTS CHAPTER

September 15—The chapter held a clam bake at Turner's Park in Longmeadow on this date, and over 50 members and guests did justice to the excellent food provided. A luncheon of clam chowder and brown bread was served at 12:30 p.m. and in the afternoon, there was a softball game, in which every one participated, and which was largely responsible for the stiff muscles complained of during the next few days. This was the second annual clam bake of the chapter, both of which had been very successful. The spirit with which they are carried on tends to create a friendlier feeling between the members in attendance.

TWIN-CITIES CHAPTER

October 8—The meeting was held at Harvard Grill and opened with the serving of dinner at 7 p. m. After dinner, moving pictures of Northern Minnesota and a trip through Mexico, including a bull fight, were shown by Mr. Denfeld and Mr. Gartner. A paper entitled, "Toxicity of Refrigerants," was presented by C. A. McCafferty.

Following this, the business session of the evening got under way with the reading of minutes, the drawing of the attendance kitty, and the approval of accumulated bills.

MILE-HIGH CHAPTER

September 11—A report by the Bowling Committee indicated that a keen interest was being taken by all the members in the league, and a vote of thanks was tendered Paul Bowman for assuming the duties of secretary of the Bowling League, who was highly commended for the fine job he was doing.

Standing committees for the year were appointed, which included the Membership Committee, Educational Committee, Finance Committee, Bowling Committee, and Entertainment Committee.

Ernie Martin, at this time, initiated the "Boners Court" by telling one on himself.

It is to be hoped that others will follow example, thus bringing about a little more humor to the informative side of the program. Refreshments were served following the meeting.

KANSAS CITY CHAPTER

October 8—Mr. Green, reporting for the committee charged with the responsibility of making arrangements for the fall "get-together," suggested that it would be better to hold a buffet lunch and dance in conjunction with the meeting. It was further suggested that this be made a Halloween party, and final arrangements were left to the committee.

Through a motion made and passed by a majority of the membership, A. L. Sullivan was elected to fill the unexpired term of F. A. Thompson, and Roy F. Cox was elected to fill the unexpired term of H. F. Andrews.

On the educational program, Charles F. Wells presented an interesting discussion on cleaning parts and fittings. Bob Cook, representing Ranco, Bush Manufacturing Company, and the Cook Manufacturing Company, was called on by Mr. Cox for a few remarks to the chapter.

October 22—In his report, Mr. Green stated that all arrangements for a Halloween party had been made and the date set for Wednesday, October 30, in the Assembly Room at the Commonwealth Hotel.

Announcement was made that Lynn Krause of Minneapolis-Honeywell would be present at the next meeting to show a new movie on Polartrons and other controls manufactured by his company.

Mr. DeWilde was called upon to explain the operation of the Norge dual temperature evaporator, operating with two float valves. He explained the operation of the Rollator with two suction lines and their location on the Rollator, which caused part of the evaporator to operate at a lower temperature than the other. He also explained the system which used a mixture of Freon and sulphur dioxide to obtain the same results. It was explained that one difficulty encountered with this system was the congealing of oil in the capillary tube.

Mr. Andrews explained the operation of the Stewart Warner dual temperature evaporator, temperatures being obtained by using a snap-action valve between the plate and high temperature coil. The refrigerant control on these units is a capillary tube.

PITTSBURGH CHAPTER

October 11—The meeting was opened with the educational program, on which Charles Allen, of Alco Valve Company, lectured and demonstrated the Alco Thermostatic expansion valve with a glass evaporator. The

ARE YOUR DUES PAID?

DON'T let your membership lapse. Check now and see that your current 1940-1941 dues are paid. Oftentimes in the rush of business you may have misplaced your invoice for dues. The surest way to see that there is no interruption in your mailings is to check up on your 1940-1941 dues.

evaporator proved very interesting to all the members and many questions were asked Mr. Allen. At the conclusion of his program, Mr. Allen was thanked for his interesting and instructive lecture.

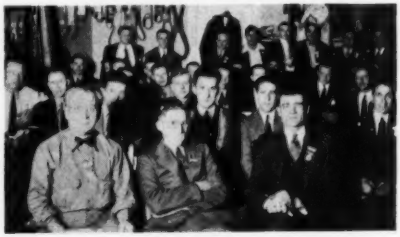
The final part of the evening's program included the showing of movies taken by Herman Goldberg at the 1940 Chicago Convention.

TRENTON CHAPTER

September 9—The meeting was called to order by Donald Peresett, and the usual business of the evening began. Harry Jaeger announced that the Ansul Chemical Company would be represented at the next meeting, which would be an open meeting. The secretary was asked to send invitations to all service men in the area to attend this meeting.

The President then appointed various working committees, which included a Membership Committee, Educational Committee, Entertainment Committee, and Publicity Committee.

October 7—This was the first open meeting of the fall season, and it was called to order by Donald Peresett. Harry Jaeger made the announcement that a representative of the Detroit Lubricator Company would be present at the next meeting and would present an interesting educational feature. George Frie read a paper for the benefit of the visitors on the purposes and accomplishments of the Society.



Trenton Chapter Meeting of October 7.

Alfred Dill of the Ansul Chemical Company was introduced and presented an interesting talk concerning the Ansul products, together with an enlightening demonstration

on Ice-X. After Mr. Dill's presentation, refreshments were served and the evening was climaxed with movies.

LINCOLN CHAPTER

October 7—The meeting was devoted primarily to the annual election of officers, with the result that J. E. Cole was elected *President;* C. J. Ennis, *Vice-President;* Lee Cook, *Secretary-Treasurer;* J. F. Wickham, *Educational Chairman;* William Myers, *Sergeant-at-Arms.*

DAYTON CHAPTER

October 4—After the business of the evening was disposed of, the Educational Chairman introduced Mr. Paul Flesham, attorney-at-law, who spoke on the subject of the conscription bill and labor conditions for the present and future. The talk proved very timely and interesting to those present.

October 12—The meeting was called to order by President R. J. Brown, and the greater part of the evening was spent in discussing service problems and remedies. A discussion also arose regarding the desirability of putting on an examination for Certificate Membership at the next meeting. Members were advised to submit their names for this examination as early as possible.

CENTRAL INDIANA CHAPTER

October 8—After the business session was over, the Educational Committee brought forth some very interesting questions regarding refrigeration, which, in turn, brought forth some widely conflicting ideas. This, however, merely proved and brought to the attention of those present the fact that the more varied the opinions, the more valuable and educational would be the discussion.

FURNITURE CITY CHAPTER

October 3—The first order of business was the election of officers for the new year. Those elected are as follows: President, Harry Scott; Vice-President, Rolland Copp; Secretary, Lester Pool; Treasurer, Lowell Scott; Board of Directors, Louis Post, Ray Falicki, Tom Cummings; Chairman of the Examining Board and Educational Committee, Vor Udell.

A motion was made and carried that the last Thursday of each month be established as the regular meeting date of the chapter. It was also decided that the Association of Commerce Speakers Committee should be given 15 minutes at the next regular meeting.

The discussion next turned to the suggestions of those present for the educational

program during the coming year. The meeting was adjourned, and coffee and doughnuts were served while an informal discussion among the members took place.

TOLEDO CHAPTER

October 9—The meeting was immediately turned over to Mr. Lindsey of Peerless of America, Inc., the speaker of the evening, who gave a very instructive and interesting talk on coils, their manufacture and applications, together with an explanation of how to choose coils of proper size and the expansion valve for installation on them.

Paul Sizer introduced for discussion the possibility of making available to the members some one of the hospital savings and sick benefit insurance plans. The membership decided to ask the representative of the Toledo Mutual Hospital Savings Association to meet with them on November 13 to explain their proposition.

Mr. Gresham gave a report on the forthcoming fall dance, to be held at Thompson's Inn on October 26.

WICHITA CHAPTER

September 20—The meeting was called to order by President Richards and because this was the first meeting of the fall season, the entire time was devoted to the business of the chapter and to approving the accumulated bills.

October 4—After the meeting was called to order, the minutes of the previous meeting read, and other business discussed, Henry Fill entertained the meeting with a showing of several hundred feet of films taken on his vacation, including scenes of the Colorado mountains, the Columbia River Highway, and the California World's Fair. All of these scenes were greatly enjoyed.

Ladies Auxiliary Notes

For information on the formation of an Auxiliary in your locality write—
Mrs. June Brunton, President
2223—9th Ave., Huntington, W. Va.
Mrs. A. H. Ross, Secretary
702 Nevin Ave., Sewickley, Pa.

KANSAS CITY AUXILIARY

September 24—The ladies met and spent the entire evening in Red Cross work, knitting shawls and sweaters from yarn supplied by the Red Cross. For the first meeting of October, both the ladies and gentlemen met at the home of Mr. and Mrs. Meeker for a pot luck supper, after which the men left to attend their own meeting and the ladies proceeded with their regular meeting.

During the course of the business session, a card was read from Mrs. DeWilde, thanking the Auxiliary for their thoughtfulness while she was in the hospital. The Chairman of the Ways and Means Committee gave a report on the profits returned from the sale of the Auxiliary's handwork. The total profits were $6.25. The remainder of the evening was spent in doing knitting for the Red Cross. Mrs. Sullivan won the drawing for Bank Nite.

TRI-STATE AUXILIARY

October 6—The ladies and their husbands enjoyed a picnic supper at Camden Park, Huntington, W. Va. This was the first meeting since the July adjournment due to a contagious epidemic within the territory. It was planned that the next meeting would be held in the home of Mrs. Brunton and that a wiener roast would be held following the meeting.

October 21—The meeting was held in the home of Mrs. Claude Brunton and called to order by Mrs. A. W. Gruber. The annual election of officers occupied the greater part of the evening with the following results: ***President,*** Mrs. Forrest Poole; ***Vice-President,*** Mrs. Donald Young; ***Secretary and Treasurer,*** Mrs. A. W. Gruber; ***Directors,*** Mesdames M. E. Harrison, J. A. Cottle, Claude Brunton, A. W. Albertson.

The new president then took charge of the meeting and a discussion arose on ways and means of improving the meetings and increasing membership. After the meeting, the men joined the ladies and all enjoyed a marshmallow and wiener roast. Every one reported having had a good time, and the announcement was made that the next meeting would be held in Mrs. M. E. Harrison's home in Ashland, Ohio.

PITTSBURG AUXILIARY

October 11—The meeting was held at Gammon's Restaurant in Pittsburg, and the discussion turned to the forthcoming Halloween party, with Mrs. Barbagello reporting on progress. The remainder of the evening was spent in playing cards until time to join the men at the Fort Pitt Hotel to see pictures of the last convention.

ROCKFORD AUXILIARY

October 7—This was the first meeting since early in August. Therefore, there was considerable business to be conducted by the Auxiliary. There were reports from the secretary and treasurer on the status of the finances of the Auxiliary, and a balance was struck on the books. The rest of the evening was spent in pleasantly chatting.

MISSOURI VALLEY AUXILIARY

September 19—The meeting was held in the home of Mrs. Cherry, and was called to order by Mrs. H. C. Haberlein. A discussion on where to hold future meetings resulted in the decision to rotate them between the homes of the members.

September 21—A wiener roast was held in Hummell Park and was much enjoyed by all those in attendance.

October 3—The meeting was held in the home of Mrs. Doyle, and took the form of a party, inaugurating a membership drive. The business session was very brief, and most of the time was devoted to the arrangements for the drive. Refreshments were served following the meeting, which were paid for out of the Auxiliary treasury.

GOLDBERG TO DEFY JINX

REFRIGERATION service men, wholesalers, manufacturers, distributors, dealers, and in fact about every one identified with the refrigeration industry, anticipate the annual Christmas and holiday party arranged by Herman Goldberg of the Herman Goldberg Company, Chicago, manufacturers' agent.

These annual parties were inaugurated four years ago when Goldberg served as the general chairman of the 4th Annual R.S.E.S. Convention held in Chicago. He invited the Chicago refrigeration industry to participate in an evening of entertainment and good fellowship to climax the success of this convention.

This year, Goldberg, with "malice aforethought," says, "I'm going to defy that Friday-the-13th jinx and am inviting everyone in the refrigeration industry from near and far to participate in this annual event on December 13th."

SUPER-SODA FOUNTAIN DRAFT ARM

THE Bastian-Blessing Company, 242 East Ontario St., Chicago, has developed a soda water draft arm with an entirely new principle that will enable the soda fountain operator to dispense fountain drinks that are carbonated approximately 30 percent higher than has formerly been possible, and which are equal or superior in this respect to bottled beverages. Fountain drinks have always in the past suffered by comparison with the carbonation of bottled beverages, and offi-

NEW TYPE DRAFT ARM

cials of The Bastian-Blessing Company predict that the new draft arm will assist fountain operators to rebuild the volume of five-cent drinks in this field that has been lost to gas stations and other types of soft drink stands. The new draft arm makes it possible to serve a 10 to 12-ounce drink of superior carbonation quality for five cents and show a gross profit of 80 percent.

The new Super-Soda Draft Arm will be standard on all 1941 Bastian-Blessing bobtails and complete soda fountains. It will operate on any soda fountain which chills the carbonated water to below 40 degrees. Further information will be sent upon request.

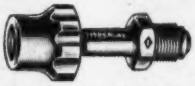
* * *

NEW "KWIK-KUPLER" BY IMPERIAL BRASS

A NEW swivel coupler, for use in quickly connecting charging lines to service drums or to charging and testing units, as well as for many other purposes, has been announced by The Imperial Brass Mfg. Co., Chicago, Ill. No wrenches are required in making connections with this new "Kwik-Kupler," it is pointed out, and the possibility of costly delay due to a broken flare is eliminated.

Imperial "Kwik-Kuplers" embody a soft composition seal gland in the swivel nut con-

nection. This seal gland makes a pressure tight seat with the male flare fitting when the swivel nut is made finger tight. The nut is extruded in a special shape and has grooves which give an excellent finger grip, assuring a tight connection with minimum effort.



IMPERIAL "KWIK-KUPLER"

The "Kwik-Kupler" is made with ¼-inch female flare swivel on one end, and with the choice of ¼-inch male flare or ¼-inch female flare on the other end. It is designated No. 474-C.

MARKHAM HEADS SALES AT AIRO SUPPLY COMPANY

APPOINTMENT of C. R. Markham as sales and advertising manager of Airo Supply Company to succeed E. W. Scotten, has been announced by E. P. Sorensen, president.

Mr. Markham is well known throughout the refrigeration industry and has been very active in affairs of the Refrigeration Service Engineers' Society. Those who attended the R.S.E.S. Convention at Buffalo in 1938 will remember "Convention News", the special convention newspaper which he planned and edited.

During the past two years he has edited "Exhibition Review", the official newspaper of the All-Industry Exhibition. He has also received wide recognition among service men for the "He Tried To Do It Himself" cartoon calendar series and the Airo catalog. This summer he planned and managed the Airo Supply Picnic which was attended by over 750 people.

C. R. MARKHAM

Under the new arrangement, J. M. Lawyer will act as assistant to C. R. Markham. R. M. Tolley, recently appointed office manager, will supervise general office routine and take charge of credits and collections.

* * *

MARC SHANTZ MOVES UPTOWN

MARC A. SHANTZ, manufacturers' representative for Tecumseh Products Company, Fedders Mfg. Company and Superior Valve & Fittings Co., has moved into new offices at 565 W. Washington Blvd., telephone—State 3124.

Local stocks are being maintained on all lines for immediate shipment to jobbers in the Mid-West.

* * *

BOB COOK TO HANDLE SUPERIOR LINE

ARRANGEMENTS were recently made whereby R. W. (Bob) Cook, manufacturers' representative, with headquarters in St. Louis, Missouri, will represent Superior

Valve & Fittings Co., according to K. M. Newcum, Vice President & Sales Manager.

Mr. Cook replaces Wm. J. Bagley, who recently severed his connection with Superior to undertake new duties, the details of which soon will be announced.

* * *

H. W. BLYTHE SUGGESTS WINTER ACTIVITY

A PROBLEM which faces most of the refrigeration service companies is the seasonal tapering off of their refrigeration service in the fall and winter months. H. W. Blythe Co. is now mailing a new fall catalog containing numerous automotive and electrical appliance items, all of which are in demand during the fall and winter holiday seasons.

Many companies and independent service men in the refrigeration field are successfully building up a nice volume of business during these otherwise dull months by aggressively pushing the sales of such items.

Blythe's catalog lists only nationally known products. A complete line of the famous Arvin hot water car heaters and car radios is carried. Lorraine spotlights and fog lights, Arvin electric home heaters, Knapp-Monarch household appliances, and Taylor instruments of various types are listed. A complete line of Arvin home radios is also available for immediate shipment.

All of these items are very popular at this season of the year, while there is a steady demand for most of them the year around for birthday and wedding gifts as well as prizes for card parties and other events.

The service man is acquainted with the housewives in his territory. No doubt he often knows what they need in their homes.

He is the logical man to benefit by this additional sales volume, and it will help him retain his contacts when the refrigeration service season rolls around again.

A request for Blythe's catalog will be promptly taken care of by mailing your request to H. W. Blythe Co., 2836 S. Michigan Ave., Chicago, Illinois.

S S S

THE REFRIGERATION SERVICE ENGINEER
November, 1940

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, and March 3, 1933, of THE REFRIGERATION SERVICE ENGINEER, published monthly at 435 North Waller Ave., Chicago, Ill., for October, 1940.

State of Illinois, Cook County, ss:—Before me a Notary Public in and for the State and county aforesaid, personally appeared J. F. Nickerson, who, having been duly sworn according to law, deposes and says that he is the editor of THE REFRIGERATION SERVICE ENGINEER, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, and March 3, 1933, embodied in section 433, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Nickerson & Collins Company, Chicago, Ill.; Editor, J. F. Nickerson, Chicago, Ill.; Managing Editor, H. T. McDermott, Oak Park, Ill.; Business Manager, L. R. Townsley, Chicago, Ill.

2. That the owners are: Nickerson & Collins Co., Chicago, Ill.; J. F. Nickerson, Chicago, Ill.; Estate of S. P. Stevenson, Chester, Pa.; M. B. Livezey, Philadelphia, Pa.; L. R. Townsley, Chicago, Ill.; Estate of Oscar Stevenson, Chester, Pa.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: There are no bondholders, mortgagees, or other security holders.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, as they appear upon the books of the company but also in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which the stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

(Signed) J. F. NICKERSON, Editor.

Sworn to and subscribed before me this 23rd day of September, 1940. L. R. Townsley, notary public. [Seal.] (My commission expires July 8, 1944.)

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